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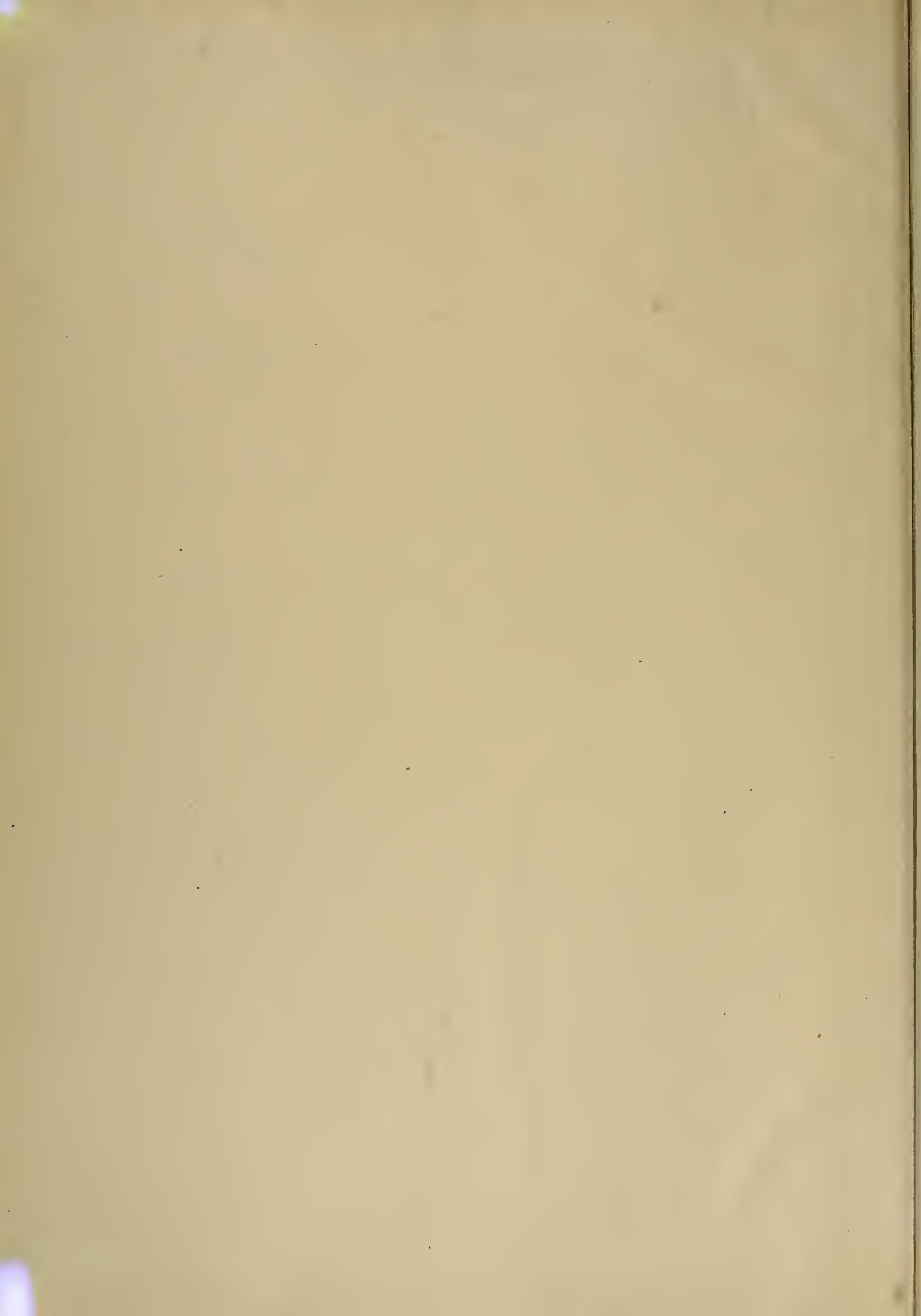
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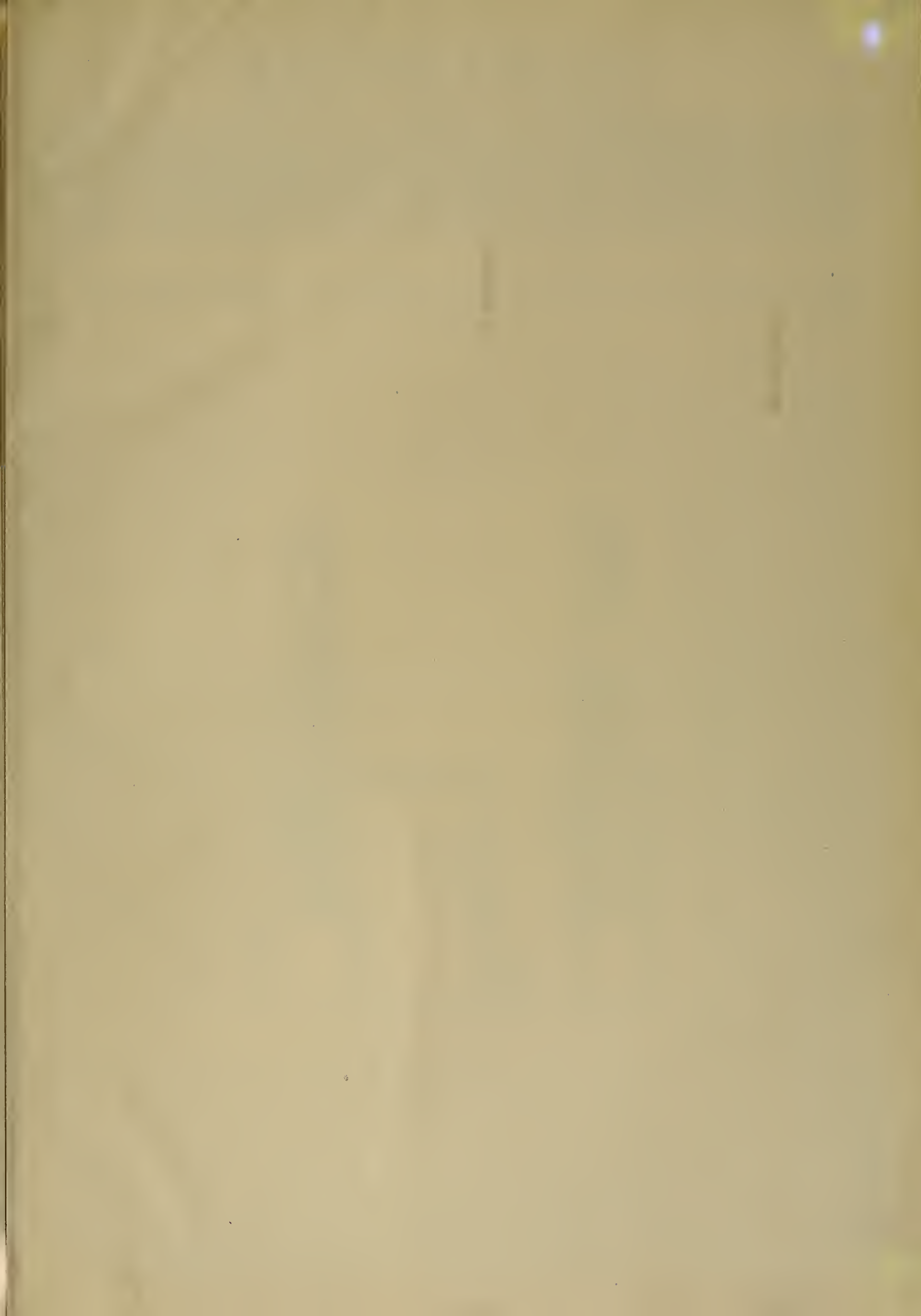
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MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, JULY 7, 1888.

VOLUME LVI.
Number 1.

Growth of the Mining Industry.

Few people beyond those directly interested realize the great advance which has taken place within the past few years in the mining industry, or how much is being done to day. To one who, like the writer, reads the "interior" papers published in the various mining towns and camps on the Pacific Coast, this realization is, however, complete. In all directions hundreds of men are prospecting for, working, developing, finding and making mines. Thousands of these mines are entirely unknown and unheard of outside the little camps where they are located. Yet there are possibilities in all, and their owners are working to develop them. It is work, work, work, in all directions; but there is encouragement always. Never a week passes but there are numerous "strikes" recorded, and each of these serves to show that the "turn" of others is liable to come at any time.

And of these smaller mines that are producing ore we hear little, but every crushing of rock adds so much to the wealth of the community. The miner who realizes his few hundred from a "crushing" is not heard of as is the mine that advertises its dividends in the thousands. Yet in the aggregate it is these little mines that make the immense difference between "total product" and "dividends" in the statistics at the end of the year. Even the mines worked at a loss add something to the wealth of the community. If it costs \$2000 to get out \$1000 there is \$1000 more than there was. The original \$2000 has merely changed hands, and the amount realized is in the channels of trade. The community is benefited if the individual is not.

Not only are there now many new camps being opened, but old mines abandoned in our days of extravagance are being re-opened and worked with profit. Ore is being worked cheaper than ever before, and our metallurgical skill is greatly improving. In the older mining regions many of the evils have been done away with. The top-heavy system is fast going out of style and more money is spent for actual work than for style in officials. To cheapen matters, water-power and electricity are replacing steam wherever practicable. People are working mines more systematically and carefully, having the future in view more than was formerly the case. Altogether, the whole outlook of the mining industry is encouraging.

MINING SUIT COMPROMISED—The great mining suit which has been pending for years between the Eureka Hill Mining Co., and the Bullion-Beck Mining Co. of Tintic, Utah, has been compromised upon a basis satisfactory to both parties. The property involved in these suits is valued at over \$2,000,000. Ex Governor Perkins is president of the California company that purchased the Bullion Beck interest, and John O. Packard is president of the Eureka Hill Mining Co. The basis of compromise is vertical lines from the surface down, and concessions have been made on both sides.

THERE is again trouble at the Wilkeson coal mines, Washington Territory, where the miners are rioting.

FRANCE takes more of our crude mineral oil than any other country, but in refined oil Germany takes the lead.

Portable Smelting Furnaces.

These portable smelting furnaces with William's improvements are made from 16 to 20 inches diameter, as shown in the elevation and section, Figs. 1 and 2. They have adjustable bottom plates the same as the large furnaces illustrated in the PRESS last week, and are also of the water-jacket type. They are made of thinner iron and separated into parts so as to be trans-

Number of Paying Quartz Mines.

A California paper, after canvassing the field, puts the number of paying quartz mines in the United States at 150. While this may include all the larger companies operating, it by no means takes in the much greater number of small ones who make a livelihood at this business, and generally some money besides. There are, in fact, more than 150 companies who make quartz mining pay in California alone, some of

The Key Monument.

Our people are just beginning to realize how much the late James Lick did for them when he left his great estate for the benefit of the public in California. The Lick Observatory is completed and in running order. The California Pioneers have their fine building and the Academy of Sciences will soon have theirs. It will not be very long before the free baths will be available, and one of the statues for which he provided has just been unveiled. It will be remembered that Mr. Lick left sums for several statues and groups. Some people among us thought this rather a waste of money and a queer thing to do, but as a community we have too few objects of art among us. There is no public art gallery of note as in older cities, and in statuary there is nothing here. The group that James Lick has provided as an ornament for the City Hall grounds will be a notable feature in this city, and it remained for him—a Californian—to be the first to erect a statue to the author of the "Star Spangled Banner."

Appropriate to the celebration of the birthday of the Nation were the ceremonies attendant on the unveiling of the statue of Francis Scott Key in Golden Gate park. The sum of \$60,000 had been set aside to build this, and to an American sculptor, W. W. Story, was given the task. This monument is the largest and most imposing structure of the kind in California. Three steps lead up on each side to a square pedestal amply ornamented with corner buttresses, evels, panels and mouldings. From each corner rise four Corinthian fluted pillars bearing aloft a handsome marble canopy, under which, in a sitting posture, is the bronze figure of the poet. On the top of the cupola stands the female figure of "America" bearing a flag-staff, from which falls in graceful and massy folds the famous banner. On two of the four panels the words of the poem are engraved. On the third is the inscription, and on the fourth a lyre in emblematic device. The whole structure is 52 feet high, and the figure of "America" with the colors is 13 feet, and that of the poet 8 feet.

An immense throng of people gathered to witness the ceremonies of unveiling. This was one of the most imposing features of the celebration of the 4th. Addresses were delivered by Park Commissioner Hammond, W. H. L. Barnes, T. J. Clunie, Irving M. Scott, and Mayor Pond. National airs were played by the band, and when "The Star Spangled Banner" was given by the band and 100 voices, the great audience joined in the chorus. This was also done with the national anthem, "America." The occasion was one to stir the patriotism of the people, and will be long remembered by all.

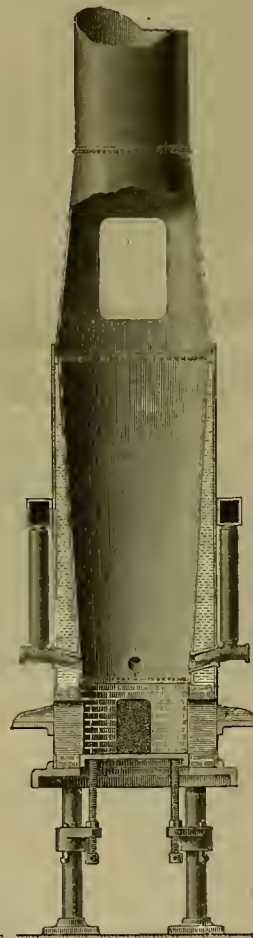
THE terms under which the Calumet and Hecla and the other American mines passed into the Copper Trust were 13 cents per pound for all the copper the mines could produce during a period of three years. It was further agreed that should the price of copper go above that figure the mines going into the combination should receive half the profit accruing from the advance over 13 cents.

THE Virginia Chronicle says the developments in the Wild Goose and Harris mines in Jumbo district, near Franktown, caused great excitement among miners, and the foothills west of Mt. Davidson are swarming with prospectors.

FIG. 1.



FIG. 2.



PORTABLE SMELTING FURNACE WITH WILLIAM'S IMPROVEMENT.

ported by pack mules. There are four tuyeres connected to an annular wind-box in the usual manner but with flexible pipes and detachable nozzles, so the tuyeres can be bared for examination instantly. There are four arches, so that every part of the interior is accessible for cleaning. Two of the arches are cut through at the bottom to permit a lead-well and siphon to be used if required.

The blast required for these small furnaces can be provided by any of the well-known means, and when power is not available, hand apparatus, such as is shown in the drawing, can be used. These furnaces will smelt from one to five tons in 10 hours, according to the amount of blast and nature of the ore. These furnaces are also made by Messrs. W. T. Garratt & Co. of this city and furnished with all the required fittings.

these consisting, of course, of only a few individuals. The above estimate must therefore be grossly out of proportion to the whole number of companies so engaged.

In other sections of the country these companies are not so numerous as in California, and that because we have here more deposits of this kind than are to be found elsewhere, the facilities for working them being also especially good. Our people, through long experience, have become masters of the business, while our methods and appliances for carrying it on have also been brought to a high degree of perfection. We have for our population an unusually large number of self employers, a fact due to these other exceptionally favorable conditions. That the number of paying quartz companies in the entire country as fixed on by our contemporary is much too small is evident.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Kernville Notes.

EDITORS PRESS:—Doubtless a few notes from this secluded locality will be of interest to some of your readers, for though mining has ceased to be the leading industry of California, still the miners are not all dead, and there are indications that the mining industry may yet revive and be established upon a more enduring basis.

There are many leads here which have not been worked since the time that flour was hauled from Stockton with ox teams, a distance of 300 miles; and yet many of those leads, now abandoned, have yielded fortunes to the prudent miner, or a poker stake to the average mining superintendent.

For the most part the placer mines were exhausted 30 years ago. A few placer deposits remain, but as a rule the young men now herding sheep and cattle look upon placer mining as a lost art. Quartz mining is still indulged in by a few workmen who have arastras or little five-stamp mills, by which they are settled with their families and doing a legitimate and quiet business.

The great Sumner mill, erected at a cost of \$1,000,000, and in connection with which more than \$2,000,000 have been recklessly squandered, stands listlessly idle. The main ledge (the Big Blue) has been worked to the level of Kern river, and an incendiary destroyed the ponderous hoisting works and pumping gear, which cost \$65,000. The main body of the yield of this mine undoubtedly came from small feeders coming in from the southwest; and as the extraction of ore from these is necessarily slow and tedious it would not pay to refit an 80-stamp mill. The fact is if we ever expect to place gold mining upon an enduring basis here we must have down with "English eyecuttes" and \$250,000 mills.

There is much talk of a railroad having been projected through the Kern river canyon, and two or three corps of engineers have examined the ground. Having passed the canyon and attained an altitude of 2600 feet, there is an open way through the Monaches valley and to the Colorado desert beyond. The canyon offers as feasible a pass as any river gorge in California, and could be passed with an absolutely level grade, coming out among the foothills of Posa creek. This route would pass to the East, where the early prospector hought water by the quart and wood by the pound. It would doubtless revive the spirit of mining and open a new Dorado. Kern river probably outranks any other mountain stream in the State during this dry part of the year. Its principal branch courses southward across Tulare county and a part of the way across Kern (a distance of 100 miles) before taking to the canyon through which it passes to the valley. Immense areas of timber are adjacent to either bank, and the water of the canyon would furnish milling power to mill all the ore west of the Colorado. Mr. Sherman, of Havilah, at one time used a part of this power to drive two quartz mills at that place. The power was transferred a distance of six miles by means of compressed air conveyed through four inch pipes. But incendiaryism has followed up a very genial and worthy gentleman from one point to another through some six conflagrations, until now it may be difficult for him to resuscitate his fortune. Thanks to this law, the devil is in the penitentiary. The experiments of Mr. Sherman with compressed air are sufficient to explode many theories in regard to the transmission of power by that means, and good engineers have declared that a sufficient power could be generated and shipped under a pressure of 500 pound to the inch, to propel all the traffic of this coast across the mountains.—S. B.

Kernville, Cal.

Los Barros Mines.

EDITORS PRESS:—Los Barros Mining district, 22 miles west of Jolon, Monterey county, situated in the San Lucia range of mountains, on the coast, three miles from the ocean, is beginning to receive considerable attention. This district is a little over one year old, the first discovery having been made in April, 1887, by Wm. Cruckshank & Son on their claim known as the Last Chance. This mine has a well defined ledge 4 feet wide, 35 feet from the surface and averaging from \$300 to \$400 per ton. A three-stamp mill has been erected. The mine has paid all expenses and left a handsome sum in the owners' hands besides. Other locations are the No. 2 Manchester with a good pay ledge, Ophir with a good pay ledge six feet wide, and Ajax (a free gold).

There are a great many other locations in the district, some of them with good prospects. There is plenty of water and timber and an excellent climate. The nearest railway station is Kings City, thence by stage to Jolon (20 miles), then 22 miles over a good trail to the mines. There is a good wagon road half way and from there pack train or saddle horses may be obtained.

J. L. DOYLE.

M. HIGNETTE makes a white artificial stone from sand, which has been used for polishing plate glass.

The Astronomer's Dream.

[Translated for the Press from the French by M. N. M.]

In his poetic manner, the eminent French Astronomer Camille Flammarion says: "I had a dream which was not all a dream. In it I found myself observing people who about a hundred millions of years ago inhabited a planet situated in the cortege of one of the remote stars in space, in the midst of a sidereal universe analogous to that which now exists, though not the same, because the universes of that time is destroyed and the universe of today did not then exist. There were, as in our epoch, constellations and stars, but they were not the same constellations, nor the same stars. There were suns, moons, inhabited worlds, days, nights, seasons, years, centuries, beings, impressions, thoughts, facts; but they were not the same.

Our earth was not yet formed. The materials which composed it were floating in space in a state of diffused nebulousity, gravitating around the solar center, which was gradually condensing. There was neither water, nor air, nor soil, nor stones, nor vegetables, nor animals, nor even any of the bodies reputed simple by the chemist, as oxygen, hydrogen, azote, carbon, iron, lead, copper, etc. The gas which would by its condensations and ulterior transformations give birth to the divers substances, gases, liquids or solids, which at the present time constitute the earth and its inhabitants, was a simple gas, homogeneous, containing in itself unconscious chrysalis, the possibilities of future times.

But No Prophet Could Forecast

The unknown which was slumbering in its mystery. Our planet presented then, this aspect of those vague nebulae of gas, which the telescope discovers in the depth of the skies, and which the spectroscope analyzes. In the midst of the stars the nebulous sun was floating in process of condensation. Humanity, with all its history, each one of us with all his energies, all terrestrial beings were in germ in that nebula and in those forces; but the beings and the things that we know were only to exist after a long incubation of centuries. In the place of what was to be the Earth, there was nothing but a gas, floating in the starry immensity. Yet it was not in the actual place where we are at present, because the Earth, the planets, and all the solar system came from afar and travel speedily.

In the history of creation, 100,000,000 of years pass like a day; like a fugitive dream they are effaced, and vanish into the bosom of eternity, which absorbs all. * * * Though our planet did not then exist, there were, as to day, stars, suns, solar systems and inhabited worlds. The beings that peopled those worlds lived their lives as we live ours.

It was an exciting spectacle for the thinker to contemplate the great labor of all those beings. In indifference, or in passion, in pleasure or in sorrow, in smiles or in tears, they were living, agitating, reposing, combating, pardoning, accusing, forgetting, loving, hating; swept away in the fatal whirlwind; coming into the world, dying, succeeding each other blindly, through generations and centuries; ignorant of their origin and of the future fate of monads and of souls; sports of nature which inflates worlds and beings, stars and atoms, centuries and minutes, like those bubbles of soap which a child blows in the air. It was the spectacle which the earth presents to us to-day; multitudes waging a battle for life and ending only with death. The view that must strike us most in that retrospective contemplation is, that the earth did not then exist.

No Human Being Approached

Anywhere near to the time when it could be one of its inhabitants. Nothing, nothing of what exists around us now, was then in existence. Nevertheless, upon those ancient worlds so long since vanished, those who were enlivening them had their current history, flourishing cities, cultivated fields, social organizations, wars and battles, laws and tribunals, sciences and arts, historians, economists, politicians, theologians, and men of letters who were striving to discern the true from the false, and to write conscientiously what they too called "universal history." For them, all creation had been stopped in their time and at their place; for them, everything was finished; the rest of the universe without bounds, the rest of eternity without limits was lost in insignificance, eclipsed by their actuality. They did not know that eternity was before them and would be after they had passed away.

They lived, the learned and ignorant, the illustrious and obscure, the rich and poor, the opulent and miserable, the religious and the skeptical, as if their lives were never to have an end. These were accumulating, without forgetting for an instant, a fortune which their sons were eager to dissipate; those were dreaming and contemplating, without care of the morrow; here some battalions were inflaming the populace by their patriotic clamors; yonder some couples were uniting in mystery their quivering souls. Pressed as they believed they were, by affairs of imperious importance, carried away by the allurements of pleasure, or lifted up on the wings of ambition, they of that time, as of this, were plunging in the vortex of life.

The History of the Eternity

which precedes us, is not only of peoples, of kingdoms, and of empires which have dis-

appeared; it is of entire worlds, of groups of worlds, of archipelagos of planets, and of universes. To eternity there is no beginning. The forces of nature have never been inactive. In nature, our measures of time, our conceptions of duration, do not exist. For it, there is neither past nor future, only a perpetual present. It continues unchangeable through its incessant transformations and manifestations. It is we who pass away; it remains.

I cannot reflect without terror upon the innumerable beings who have lived in the worlds that have disappeared; upon all the superior intellects which have thought, acted and guided humanity in the path of progress, of light and of liberty. I cannot think of those Platos, Marcus Aureliuses, Pascals and Newtons of the vanished worlds without asking myself what has become of them. It is very easy to reply that nothing of them remains; that they have died as they were born; that all is dust and returns to dust; the reply is easy but not very satisfying.

Assuredly I have not the simple pretension of resolving the great mystery. It seems to me that in treating these unfathomable problems of eternity and of infinity we are pretty much in the condition of ants endeavoring to inform themselves of the history of France.

It Would be Without Doubt

As useless as it would be childish to lose ourselves in the nebulosities of metaphysics by trying to find a solution which will probably always escape us, but is it not a subject of contemplation worthy of our thoughts, to reflect upon that particular aspect of creation, Time; to reflect that throughout eternity other earths inhabited like ours, have floated in the light of their suns, that through all eternity there have been beings enjoying life, and that during all time, the hour of the end of their worlds has sounded on the secular dial of destiny their doom, shrouding in turn the universes and beings in the winding-sheet of destruction and of oblivion? It is impossible for us to conceive a beginning which had been preceded by an eternity of inaction, and so far as science conducts us, it shows us everywhere forces in perpetual activity. If infinite space dazzles us by its immensity without limits, eternity without beginning and without end rises up more formidable still, perhaps, before our terrified contemplation. The voices of the past speak to us from the depths of the abyss and they speak to us of the future. The past of the worlds which have disappeared, is the future of the earth.

In 100,000,000 of years, the earth on which we are will no longer exist, or if any ruin of it yet remains, it will be only a mournful desert. The divers worlds of our solar system will have finished their vital cycle, and the varied histories of mankind which succeeded each other will have been long extinct. Our sun itself, will without doubt, have lost its light, and will roll a dark object in the nocturnal immensity. Throw a hack, perhaps, by the laws of destiny into the crucible of perpetual metamorphosis, it will be reunited with a supreme shock to that defunct old sun, and, hurled like it through the eternal void, may be revived from its ashes a radiant phoenix, relighted by the transformation of the movement into heat.

In That Time, Moreover as Now.

The nebula will have produced suns, and as to-day, boundless space will be studded with stars without number, gravitating in the harmony of their reciprocal attractions; then, as now, earths will be halanced in the light of their suns, the mornings and evenings will succeed each other, blue skies will expand, clouds will float in the charm of twilight, and perfumed atmospheres will flow over woods and valleys. Nature will sing the marvelous budding of life, as to-day, and chant the hymn of youth and happiness and imperishable spring-time, in that immense universe where the historian of the past sees only tombs.

If there are no limits to space, if toward some point of the heavens to which our thought takes its course, it can fly evermore, without anything to stop it, whatever may be the rapidity of its flight, whatever may be the duration of its indefatigable soaring, if, in a word, space is infinite in every sense, it is the same as eternity. * * *

Infinite space is actually gemmed with incipient worlds, with worlds which have attained a virile age, it is strewn with worlds in decadence and worlds dead, it disseminates in all the boundless regions of immensity, gaseous nebulae, suns of hydrogen, oxyd stars, planets in formation, satellites cooled, and comets disintegrated. The forces of nature show themselves everywhere in activity; the energy of creation remains constant, without possibility of augmentation or diminution, and all the sciences coincide in testifying that what we call destruction, annihilation, is only transformation. Astronomy reveals Time to us, as it reveals Space; it shows that our present epoch has nothing particular in the history of nature any more than has our present place, and invites us to recognize duration as well as space, those two forms of reality, contemplating in the same synthesis the grand aspects of the universe. * * *

This Dream Was Not All a Dream

For the beings who have lived upon the different worlds in space during the eras anterior to our solar system, the earth, with all its history, was only a possibility of fecundations for the future. Historiographers of

terrestrial peoples, Moses, Herodotus, Manethon, Ma-Tsun-Lin, Titus Livius, Tacitus, Gregory of Tours, Bossuet, all you who imagine yourselves writing "universal history," and thou, great Leibnitz, who didst commence at the creation of the world the history of a small German duchy, and thou, also, charming author of the *Metamorphoses*, who to us hast related of old the origin of heaven and the gods, the astronomer smiles at your famous annals, as he smiles at the genealogies of kings and the conquests of the Cæsars.

Comets of ants upon small spaces, natural illusions of children who caress their puppets! Let some one invent a new microscope that will enable us to distinguish Charlemagne and Napoleon in the ant-hill of Lilliput. We no longer find them. And the whole earth, where then is it? The abstraction of the thought comes to us of living before and after it. The entire history of it has vanished like a flash of lightning which passes over in the stillness of a long summer's day. * * *

As I contemplated those pncornas of time and space, which the centuries of the past defiled slowly before me with their large corteges of disappeared glories, the beings who peopled the revived worlds to their furthest extent cast away their shrouds and walked in the flowery paths of life; all that secular and prodigious past became present, and the millions of extinct suns, of era upon era, became relighted and resplendent. Innumerable stars appeared in the sky, which our mortal eyes have never seen, and the light of life radiated upon celestial shores which succeeded each other to infinity. Suddenly, an immense black veil fell from the height of the skies in front of those luminous bodies, and I beheld no more. Before that veil the planet on which we are was turning with its velocity of a hundred thousand kilometers an hour, and I was again in the condition of the other inhabitants of this earth, who live without seeing beyond their horizon, and who imagine that in time, as in space, our mediocre race of human beings is the only one that ever had a place in the universe.

Laziness and Luck.

About three years ago Frank Martin sold his Horn Silver mine at Era for \$56,000. By his drinking and gambling he has reduced this to about \$1000, and his wife now petitions the Portland court to have a guardian appointed for him.—*Idaho Register*.

To read the above paragraph, says the *Nex Peros* (Idaho) *News*, one would naturally say that there was nothing in it; that it was a common every-day occurrence. But read this: Three years ago Frank Martin was as worthless a vagabond as could well be produced—one of those who never missed a meal nor paid a cent. He resided at a place called Era, in Altnas county, in this Territory, had no occupation and sponged his living from his brother, who had a small ranch and kept the postoffice by the roadside. One day his brother's wife requested Frank to cut some wood. He refused, whereupon she heat him out of the house with a rolling-pin and forbade him to ever enter her doors again. Sad and dejected at the condition of affairs, Frank walked up a hill in the rear of his once happy home, until within a short distance of its summit, when he sat down upon a flat rock, at the same time stretching out his legs and bracing his feet against a small howler in front of him. He had not been there long when the howler gave way and went rolling down the hill. Frank raised himself and listlessly followed after the rolling stone, and just here will we digress and say that his then experience exploded this aphorism that a "rolling stone gathers no moss"—and picking it up, was surprised at its weight and general appearance. He showed the stone to some miners soon after, and they pronounced it horn silver ore of the richest character. Thereupon Frank prospected the place and soon found a ledge that paid big from the start, so that in less than a month after opening the mine Mr. Frank Martin's check was worth its face, from \$3000 to \$5000. He had hosts of warm friends—indeed his friends were red hot—reaching from Houston on the north to Blackfoot in the center and Hailley and Salt Lake in the East.

One evening, after delivering a shipment of his ore to the reduction works at Hailley, Mr. Martin dropped into a restaurant and ordered a square meal. He was promptly served by a comely waiter girl, and, being in a somewhat hilarious mood, challenged the girl to marry him then and there. She accepted his proffer, a Justice of the Peace was sent for and the twain were made one. About six months after this he sold his mine for the sum above stated, and, naturally enough, the transition from extreme indigence to much wealth unshipped what little intellect he had.

Moral—Wealth is a blessing to some but a curse to others.

PHOTOGRAPHING FROM THE LIGHT OF FIREFLIES.—Dr. John Vansant, of the United States Marine Hospital at St. Louis, claims to be the first to have taken photographs by the light of fireflies. He placed 12 fireflies in a three-ounce bottle, covering its mouth with fine white hosiery. The average duration of the flash of each insect was half a second, and the luminous area on the abdomen was about one-eighth of an inch square. The time of exposure was 50 flashes.

SALT LAKE CITY is to have an industrial school.

The Close Fist Company.

Some Things That Stand in the Way of Prosperity.

"The old claim is pretty well worked out, in fact has been for a good while; but it is hard for two old chaps to move. So Pard and I have picked over and up the bedrock, cleared up the crevices and worked poor dirt year after year. But recently Pard said he was going to see if he could not buy or lease a piece of ground owned by the Close Fist Mining and Water Company. He said he knew just what the company paid for the ground ten years ago, and as they have never stuck a pick into it he thought they would be glad to get what they gave for it or to lease it on reasonable terms. So he saddled up the old mule and lit out. He returned yesterday. I saw he was disappointed and had seen things that had 'loaded' him. After supper I asked:

"Well, what did you do?"

"Nothing," said he rather short.

He drew several long whiffs from his pipe and then said:

"I don't understand some things. I could not get that ground for love or money—unless I paid ten times what I could afford to. The company that owns it has not touched it for ten years, in fact, have never stuck a pick into it; but that makes no difference. All I could get out of the agent was: 'We have no ground to sell.' Of course that settled it. In going and coming I saw at least a dozen old claims that I know would pay decent wages to laboring men that are and have been idle for years, and not the remotest hope of their being worked. I heard maledictions, loud and deep, poured out on the owners of patents that cover hundreds and thousands of acres of good mining ground that is good for these times. One man said to me: 'The anti-debris people are hard enough, the Lord knows, but they are not one-half as poison as this infernal law that permits a few men to hold thousands of acres of mining ground in idleness year after year.' Well, I had to give up the mining project, so I thought I would go and see if I could get that farm old Bill D. left to his widow who lives somewhere in the East, and if I could, you and I could go to raising fruit and garden truck. There is as nice a farm, or rather a nice piece of land as lays out doors, and worth four times the price asked, but there is no title. A mining patent covers the ground, and so we would be liable to be hounded any day. For mining, the 160 acres ain't worth 10 cents, but it would make a lovely home for anybody with muscle and brains. It saw a place all grown up to hush and weeds, and my attention was arrested by seeing a scrubby peach tree and a tangle of roses among the general waste. I was told that a few years ago there was a fine orchard of apple, peach, pear and plum trees and a good set of farm buildings on this place. It is now a wreck. A mining patent covers it and drove out the farm owner. I saw five of these abandoned and wrecked orchards and farms on my trip—places that seem to curse their present owners. Not one of these places I saw will ever be mined, but the mining law has ruined them and left them monuments of either the law's stupidity or somebody's rasality, blamed if I know which. It seems to me our laws ought to permit the cultivation of ground until the owner of the mineral wants to take the mineral out. Again, does it not seem tough that mining ground can be held year after year in great tracts and not be worked, when there are hundreds of men that would be glad to get it? Between the valley farmers and the mining patent owners, it looks as though the people of the mountains would have to leave."

"Well," I asked, "what are you going to do about it?"

"I am going to stay here a little while longer and then git, and the Close Fist and its allies can take the county and put on all the Chinamen they want to. I am too old to enter a fight with millions of money, owned and manipulated without fear of God or men, so when we have skinned the last particle of dust out of this old claim we will dig our few hills

of potatoes and take our line of march for—the Lord only knows where."

The old man knocked the ashes out of his pipe with a vicious whack on his thumb-nail, cast a side-long glance at an old rifle that hangs on the cabin wall and went out.—*Nevada Transcript.*

Cost of Mining.

Dr. George C. Munn of the Denver mint in his report of the production of the Colorado mines, gives the following as the output of some of the Clear Creek county mines:

Colorado United.....	\$131,111 04
Colorado Central.....	283,806 79
Diamond Tunnel.....	141,984 82
Freeland.....	105,855 92
Jo Reynolds.....	175,476 40
Atter.....	60,801 10
Little Mattie.....	52,342 42
Pitkin.....	115,430 75
Seven-Thirty.....	143,131 67
Two Sisters.....	63,600 94

He gives the following as the total products since 1859 of three of the oldest mining counties:

Clear Creek.....	\$35,502,693 68
Gilpin.....	47,463,313 76
Summit.....	13,704,731 03

The estimated cost per ounce of mining gold and silver in the different counties is as follows: Boulder, \$1.70; Chaffee, .145; Clear Creek, .48; Custer, .136; Eagle, .21; Gilpin, .54; Gunnison, .48; Hinsdale, .64; Lake, .3516; La Plata, \$2.50; Ouray, .755; Park, \$1.29; Pitkin, .165; Saguache, .43; San Juan, .13; San Miguel, \$1.47; Summit, .145.

The estimated value of the bullion produced in Colorado from the date of the first discoveries

The Prospector.

The prospector is seldom a man of means, says the Nevada Co. Herald. Neither is he a scientific mineralogist. The man of means does not care to dig in the earth for gold-bearing ledges, and the mineralogist finds everything but quartz. The Simon-pure prospector is a poor man, and he goes to prospecting knowing that he may find something which will remove poverty from him, and place him in a position to enjoy the real pleasures of life. With this hope he goes into the hills and canyons, into the woods and thickets, and hunts for gold-bearing ledges. It is not a pleasant task. Day after day he searches, and day after day he is disappointed. But he does not give up, and at last he finds that for which he is hunting. A ledge which "looks good" is struck. He fixes his camp there, and proceeds to sink a shaft. He is alone and the work proceeds slowly. He may be oved on and killed, or any one of a hundred accidents may befall him, and there is no one near to offer assistance. Yet he does not falter, but digs steadily, only pausing long enough to go to town or to a country store and lay in a fresh supply of provisions. Sometimes weeks, or even months, are spent upon the "prospect." At last he strikes a body of good ore. He feels sure that a fortune is near at hand. But he cannot develop it. He must enlist capital or sell his prospect. To this end he selects a quantity of specimens and goes to town. Then the hardest part of all the work begins—that of getting somebody interested in the "find."

If the rock shows a large quantity of free

there have been more and better developments made the past three years in quartz than during any similar period in the history of the county. Instead of two quartz-mining districts, which the county had five years ago, it now has five. Grass Valley is the oldest district, and it is better to-day than ever. Nevada City district has had a "hid eye" for a time, but it is certainly shaping itself for a big showing after a while. While extensive work has been suspended in this district for awhile, developments of an important character have been going on in the interior which will prove our assertions. Washington, Eureka, and Columbia Hill are safe for a good showing for years to come. From private letters we are informed of very flattering prospects in two other counties, and these strikes have been made by men who have been liberal in prospecting for years without favorable results until now. God bless the liberal gold prospector! They deserve success and in the end they always get it. Mining is coming into great prominence again in California. Every good strike kindles a desire for investment of capital. Mining, when successful, affords greater profits than any other field of work. It will attract its share of capital from this time on, and mining counties will jump into a new era of prosperity.—*Nevada Co. Herald.*

A Historic California Town.

Generally by a historic town in California we mean a town which has lived through the Mexican regime and continued through American occupation, but we refer now to a town which sprang up since the occupation and is one of the oldest towns with a purely American history. It is the town of Benicia, which was founded by the early American settlers and was designed as the metropolis of California. The place was made the capital of the State, and it seemed that the substantiality of the city was assured. But by one of those vagaries for which trade is noted, the scene of busy commerce shifted, the capital was moved, the interests which promised to contribute to a city's growth were dispersed, and the town of Benicia, with its wealth of natural advantages, is yet one of the smaller municipalities of the State, and awaits with never-dying hope the fruition of its early promise. It has a permanent population of 3000 or more. It is about 30 miles from San Francisco, and 57 from Sacramento.



VIEW OF A PORTION OF BENICIA, LOOKING SOUTHEAST.

in 1859, to the close of the year 1887, is as follows:

Gold.....	\$82,673,125 92
Silver.....	176,145,640 80
Total.....	\$257,818,766 72

THE COPPER QUEEN ROAD.—Active work has begun on the new line of railroad to run from Fairbank, on the New Mexico and Arizona Railroad, a branch of the Santa Fe, to Bisbee, where the mines of the famous Copper Queen Mining Company are located. The distance will be about forty miles. The road will run through Tombstone mining district, but will not strike the town of Tombstone. It is said that the road will be built by the Copper Queen Mining Company, through probably it will be operated by the Santa Fe Company. For the present the road is intended to supply a local demand, but the probability is that it will eventually be extended to the rich mining country in Sonora, Mexico, immediately south of Bisbee.

JOHN WILLIAMS, a well-known mining man and an old resident of California, died at Placerville on Tuesday of hemorrhage of the lungs. John Williams has been in California since 1852, and has traveled through Brazil, Central America, Africa and Australia in connection with mining matters.

A USEFUL DEVICE.—A rubber funnel which may be fitted over the head, big end up, so as to enclose all the hair while the barber shampoos a customer. A tube hangs down behind, so as to carry away the suds, while a hose for flushing out the hair, funnel and tube is provided.

gold there will be no trouble in getting men who have money to go and examine the ledge. But in many cases the inspectors declare it is too small, or not as good as represented. They have a long consultation, have assays made of the rock, decide that it is not what they supposed, and finally decline to put any money into it. Then the prospector begins again. He goes from one capitalist to another. The months drag by, and at last he finds that he must either sell his find or leave it. Somebody has offered him a low figure for his claim, and he may or may not accept it. Nobody recognizes his right to ask a fair price for it. They tell him it is only a prospect; it may pinch out, or be only a pocket-ledge, or anything but a good mine in embryo. At last he sells the property, and the new owners develop it. It becomes a good paying mine—a valuable property. The prospector, who has spent months upon it, has received a few hundred dollars, and the new owners reap a harvest of many thousands. It is this method of treatment on the part of capitalists that puts a check on the prospector's work. The man who hunts for gold is not encouraged. His reward is too small. He must do his prospecting at his own expense, and then, if he is successful, there is nobody willing to give him a fair compensation for his time and labor. On the contrary, every man would sooner take advantage of him. This checks prospecting, and when prospecting is checked in a mining region, the prosperity and development of the region itself is checked.

MINING PROSPERITY.—There is no question about the splendid outlook for the mining industry of California. In all our exchanges we see accounts of good strikes, and in this county

The Central Pacific railroad runs through the town, crossing the Carquinez straits upon the mouster ferry Solano, which conveys cars and locomotives across the stream. At Port Costa, on the other side of the straits, connection is made with the Southern Pacific railway, which runs to Los Angeles. There is thus a convergence of railway lines at Benicia and Port Costa that makes this locality favorable for manufacturing and shipping, and immense wharves and warehouses have sprung up, and there has been established, in some measure, the results that the early settlers of Benicia foresaw. But the interests are now scattered. Could they have been concentrated in Benicia, the city would be one of the most flourishing in the State to-day. The favorable conditions, however, are being more and more appreciated, and Benicia undoubtedly has a prosperous era ahead.

The site of the city consists of hills and sloping or rolling land. The heights back from the water front offer elegant building spots, and already numerous showy and pretentious dwellings are to be seen. The view from these elevated sites is fine indeed, looking out upon the turbid waters of the straits, and over to the highlands of Contra Costa county beyond. To the west, the waters of San Pablo bay spread out, offering a water stretch as far as the eye can reach.

Our view of Benicia looking toward the southeast, shows a part of the town in the foreground. Beyond flows the magnificent Strait of Carquinez, a mile in width, connecting the upper bay of Suisun and the lower bay of San Pablo. Opposite lie the low rolling Contra Costa hills, while away to the southeast looms up the purple dome of Mount Diablo, as shown on the left of the distance in the picture.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. *Amador Ledger*, June 30: Preparations are being made for sinking at the Wildman mine, which will be commenced in a short time. In all probability they will sink 100 feet, which will, we hope, develop an excellent mine. The mill in the meantime will be run if possible.

NEWTON COPPER MINE.—Some 10 or 12 men, all white, have been started to work at this mine, and are filing up preparatory to underground operations. Steve Moyle of Sutter creek is foreman. A boarding-house was started last Monday for the accommodation of the hands. Altogether everything wears a busy outlook around this property.

MISCELLANEOUS.—Martin Jones, president of the Amador gold mine, came up to Jackson from San Francisco last Saturday, to fix up matters connected with the mill-site purchased from the Amador Queen. A right-of-way has been secured over a small strip of the Doyle claim, but the mortgagees of the Amador Queen have yet to sign the deed conveying the mill-site.

LIVE OAK.—Amador *Dispatch*, June 30: The mill at Live Oak mine was started up last Monday to crush the rock taken out of that mine a sample sack of which has been left at this office, and looks to be a very high grade. The shaft is down about 180 feet with a ledge 18 or 20 inches wide and growing richer as they go down.

Calaveras.

GOLD.—Angels *Record*, July 3: We were shown a specimen that came from the Whittle mine, which looked first-class, it being covered with gold. About 200 tons of the ore is being hauled to Smith's mill to be crushed.

VOGT MINE.—Calaveras *Chronicle*, June 30: The Vegt gravel mine on the Mokelumne river, about three miles above the Big Bar bridge, upon which Mr. H. Vegt has been prospecting for about a year past, has, we understand, shown evidence sufficiently satisfactory to justify the erection of machinery, in the way of hoisting gear and pump, to operate upon it. We are informed that the machinery is now at Valley Spring awaiting transportation to the mine.

UTICA.—*Mt. Echo*, June 27: The boiler at the Utica mine was badly strained last Monday morning, necessitating the drawing of the fire from the furnace. Work was suspended in the mine for several hours, pending the repairing of the boiler. Everything is again running in full blast. Preparations are making at the Utica mine for the erection of the new hoisting works. The frame work will be 75 feet in height when completed, and will be the largest ever built in the county; 40 stamps more will soon be added to the 20 now in operation. The engine and boiler for the Confidence mine arrived during the week, and will be put in position as soon as practicable. The mill, we understand, will start up in a few weeks. Everything is progressing finely in the mine and a very good grade of ore is being extracted. Samuel Gillman will resume work on the Green Mountain mine, situated about three miles west of Angels. The ledge is now seven feet in width and prospects well. It is worked by means of a tunnel.

Fresno.

COAL MEASURES.—*Expositor*, June 28: C. D. Davis, from the Coast Range, reports that there is great excitement here in reference to coal. Prospectors are scouring the hills and valley in search of coal veins. They have discovered many indications, but as yet little has been done toward developing their finds. Coal and petroleum exists there, and indications are found in many places, but it will take time and money to develop the finds sufficiently to judge of their extent. The great trouble with the coal veins is in the manner in which they lay. Having been thrown up by upheavals of nature the veins stand on an incline.

Inyo.

PROSPECTING.—*Inyo Independent*, June 30: For some weeks past C. K. Fox has been prospecting in the foothills east from Independence station. Toward the end of last week he struck a ledge that is opening out big. The vein is now about four feet wide and gives every indication of being a large ore body. The ore is galena, carrying a high percentage of lead and a good deal of silver. Henry Galvin is interested with Fox.

LEAD.—During the past ten days there has been considerable advance in the price of lead. Miners who had quit work are resuming operations again. Whittier, Fuller & Company of Melrose, Alameda county, have sent orders for shipments to operators; they offer \$4.12 per hundred. The terms offered for silver are also a little better than for some months past. This is causing better feeling at the lower end of the county. The Haggin mine has been leased by Mr. Anthony. The mine is located 24 miles from the Riley mill and the ore will be hauled there to be worked. Several miners have been at work in the mine for some weeks past. Recently quite a body of ore was struck; assays give over 300 ounces of silver per ton. In the mine the ground is soft and will be expensive to work; timber must be hauled 50 miles. Mr. Anthony will go to the mine at once and intends to push the work rapidly. The district is in a mountainous and desert country about 100 miles southeast from the railroad at Keeler.

Nevada.

HIGH-GRADE ORE.—*Transcript*, June 28: There has just been crushed at J. C. Locklin's custom-mill a 20-ton batch of ore that yielded \$75 a ton. It was extracted above water level in a recently developed mine of this district, and there is plenty more equally good yet to be taken out. A few days ago one ton taken from another mine in the same neighborhood yielded \$90 worth of gold.

PROSPECTING.—*Grass Valley Union*, June 28: The prospecting work that is being done in the Brunswick mine is quite encouraging. The work of sinking a shaft on the Ford & Reilly ground (now the Oro Hill mine) is going on regularly. There is a great deal of work being done in the Omaha mine now, men being at work on all the levels from No.

5 to 10, either as tributaries or on regular pay. One of the most encouraging features of the work has been the finding of good pay ore in the north drift of the No. 6 level, where the finding of good rock had not been anticipated. The general appearance of the mine is encouraging. The water has been pumped out of the Lone Jack shaft to the depth of 400 feet, and it is being found a tedious and troublesome job, as owing to the mine having been idle for over 20 years there is a great deal of slum in the shaft, which is not nice material to handle. There is but little known in reference to the former working of the Lone Jack, and in pumping out the mine it is like exploring an unknown region. At the depth of 400 feet it is found that two shafts are sunk below, one following the hanging and the other the footwall of the ledge. It is not known how deep these shafts go, and relieving them of the accumulated debris is going to be slow work, but Supt. Mainhart will "get there all the same." The Lone Jack was once a good gold producer, and that the pay-shoot will be found again there is every reason to believe.

Plumas.

PLUCK REWARDED.—*Plumas National*, June 30: F. B. Whiting has been the owner of the French Ravine quartz ledge for years and has always expressed his unlimited faith in its richness. A short time ago he started a tunnel in the ledge, and last Monday he was rewarded by striking a rich vein, finding one piece valued at \$500, with indications of a permanent paying ledge.

GRAVEL.—*Plumas National*, June 30: Johnson and Richwine, on Mill creek, near Rich Bar, are taking out good pay. Horace Reynolds will push his tunnel for pay on Mill creek. He has just arrived from below with a large supply of provisions and mining supplies. Camille Girard, at Lower Indian Bar, on the North Fork, is making good wages. Whiting's French Ravine ledge is panning out satisfactorily. The big China company on Fale's hill, has suspended work for the want of water. Bennett & Morton, at Five Points, are cleaning bed rock with good results. Henry Orr and Hank Luman have struck a good streak of gravel at the Orr claims and are looking happy. Porter and Fogarty are driving their tunnel into Claremont, and expect to strike the "Blue Lead" in a short time. Dunk McDonald and Jno. August, on Mill creek, are regularly panning out the dust in paying quantities. The quartz mill at the Orr, Bushman & Co. mine, is progressing satisfactorily, and will be in running order some time next month, when we expect to hear of some good cleanups. Johnnie Higgins, at Michigan Hill, is prospering, and wears a smiling countenance, a sure indication of good diggings. Duncan & Patten have a force of men at work on the Ohio Point quartz ledge, running a tunnel, with every indication of a good paying mine. J. E. Mills still has a force of men on the Halstead mine at Rich Gulch. The 2000-foot tunnel of the Consignee Co., near Cromberg, is being pushed steadily ahead. There are about 12 or 15 men at work on the Plumas Eureka bedrock that are doing well. The Plumas Eureka is working about 250 men, and it is reported as paying better than at any time for 20 years. The old mine is inexhaustible. Johnson & Goodwin have suspended operations on the Middle Fork for the season, on account of the scarcity of water. Erichson and the Murdock brothers, on Waposisie, have good claims, and are in good paying gravel.

San Benito.

QUICKSILVER.—*San Benito Advance*, June 30: Six hundred pounds of quicksilver were shipped from the Gypsy mine last week. The miners are now working in ore that contains 75 per cent of metal.

San Diego.

SALE.—*Julian Sentinel*, June 29: Wm. Maher has disposed of a one-third undivided interest in the Fraction mine at Bonner, to David Edwards, for \$500; same to Thomas Rowan, same consideration.

STRUCK IT RICH.—On Tuesday afternoon last, Messrs. D. Ferguson, Ed. Armstrong and S. Ferguson marched into the office and commenced piling specimens of ore upon our desk. Upon examination we found the rock to contain considerable free gold, but when we asked where it came from the boys were suddenly taken with a severe attack of dumbness. They claim to have struck a good ledge, but refuse to give its location, saying "it's only a little way from here." The boys are highly elated over their discovery.

Shasta.

PROSPECTING.—*Redding Free Press*, June 30: Andy Woodward has returned to his home at Stella and resumed prospecting on Mad Ox Gulch. Lou Gross started up the country the other day to view some extensive deposits of fire clay that has been opened up near Slate creek; he found it in abundance, and of superior quality. This will be a great advantage to our growing city. Ed. Reid has resumed operations on the Samson mine, with a view to providing for campaign expenses. Messrs. Van Burgen, Thorne & Co., of San Francisco, have bonded the Kit Carson Mine on the Igo road for \$3,000. As they informed our reporter, they will go down one thousand feet if necessary to test the capacity of the ground, and they have the capital to do it.

Sierra.

A RICH QUARTZ LEDGE.—*Cor. Mt. Messenger*, June 30: The Buffalo mine, half a mile below the Primrose, in Hog canyon, I recently had the pleasure of visiting and was shown around by one of the partners, Mr. Lee. The public may be prepared to hear in a short time of it turning out to be one of the richest quartz ledges in the mountains. It is a most singular formation but prospects extraordinarily well from wall to wall, and is in width from 8 to 20 feet. The ledge is mostly a decomposed mass except where the white quartz starts like an immense honey-comb, and from the decomposed matter has been panned as high as \$12 to the pan in free gold, and in many pans from \$1 and upward, and in one I obtained 50 cents. The white honey-comb quartz that seems to keep the ledge in position is often spangled richly with gold, besides some galena and sulphurates. The dark, soft matter is full of small quartz crystals, and, in places, it might be shoveled out into sluices; and what would be taken in other ledges for scattered masses of porphyry here is the color of that with the consistency of clay, and might be dug out with a spade. The company have in a tunnel north on the ledge, 350 feet that prospects as favorably. A shaft was put down 50 feet, and on the bottom the

prospect was better. About 600 tons of rock from the tunnel and shaft are on the dump. The Buffalo company has consolidated with Henry Carpenter, who owned the south side of the creek and worked on and exposed the ledge, while mining in his claim for gravel, but did not know the fortune there was in sight. A lower tunnel, started near the creek, will tap their shaft and upper tunnel, securing good air and deeper backing. The ledge was reached with the lower tunnel the other day, and the rock prospects well. It is intended shortly to put up a 20-stamp mill.

THE BUFFALO MINE.—*Tribune*, June 29: Active work is going on at the Buffalo mine. Six men are employed there and they are pushing ahead the work with vigor. The upper tunnel has been run 350 feet and therein is opened up a splendid body of ore. No. 2 adit last Sunday was in 50 feet. It will take but a short time to run this tunnel a long distance into the hill, when it is safe to wager the owners will have something that will open the eyes of people. The prospects to be obtained throughout that mine are something immense. The writer can vouch for this as he was there last Sunday. The company is well satisfied with the condition of their property, and they propose as soon as possible to arrange for the building of a mill.

Siskiyou.

QUARTZ AND HYDRAULIC.—*Yreka Journal*, July 4: The San Francisco Co., operating the quartz mine at Gold Hill, Scott river, with Mr. Shepard as superintendent, have struck an extraordinary rich lead or seam, about two or three inches wide in the center of their ledge, which is over half free gold. Their mill of ten stamps, run by water-power is kept in operation all the time, crushing quartz from the main shaft to see what the average quartz pays, leaving the richest portion to be crushed separately, after taking out what can be secured by hand. It is reported the company intend adding more stamps to the mill in a short time. The Warren quartz mill, removed from Greenhorn and set up on Yreka Flats, just west of town, is now in running order, and a portable steam engine used for threshing, was hauled to the mill last Thursday, so that it will be in readiness for crushing just after the 4th. It will be operated by H. B. Green, giving all the quartz miners of Yreka and vicinity, who have good ledges in the Humboldt mountains west of here, a good opportunity to thoroughly test their claims. Hon. R. H. Campbell is now winding up the working of his hydraulic claim in Quartz valley as water is getting short, and will make a final cleanup in about two weeks. He has had an excellent run this season, with good returns, and the prospects look more promising for future seasons, with the additional facilities for working on a more extensive scale than heretofore. The old Steamboat mine on McAdams creek, now owned by a San Francisco company, is being worked on a large scale, employing many miners in drifting and other work. A new shaft has been sunk and the water kept pumped out by means of the regular 25-horse power engine assisted by a donkey engine. A new boiler is also on the way to replace the old one, not able to stand as much steam as the engine can carry. Some fine prospects have lately been taken out of the Sorrenson quartz mine on Indian creek, now owned by John Stewart, which averages generally about 338 a ton. Geo. Baker of Indian creek is in the town and showed us some exceedingly rich specimens from his claim. He has found an old channel of the creek, 70 feet wide, filled with cement, gravel, ground up boulders and quartz, which requires crushing in a quartz mill. For some months past he has been digging a cut to drain the water by connecting with an old tunnel built in early times, and is now able to work the claim with the greatest success. He had eight tons of this conglomerate crushed last week and realized \$13.06 per ton, but some of the specimens found are nearly half gold, plainly visible to the naked eye. The indications are favorable for finding very rich pockets all through the channel. Messrs. Martin Squiers and Chas. Taylor have also found very rich prospects in their quartz ledge on Indian creek and will soon take out a big stake, which their industrious perseverance eminently merits. Weldman & Co., of Greenhorn own a very rich quartz ledge from which they have 100 tons or more on the dump. They pay all their expenses by simply pounding out quartz occasionally in a hand mortar. A few weeks ago they sold a fine specimen for \$125 to a San Francisco man stopping at the Franco, and refuse to sell out for less than \$50,000, offers having been made to bond the mine for \$20,000. This claim is almost within sight of Yreka, and the hills surrounding us on the north and west are full of rich quartz ledges if the proper effort is made to develop them.

Tuolumne.

FINE ORE.—*Union-Democrat*, June 30: It is reported that the Platt and Goulson mine is sending forth some very fine ore. Solsburyville is surrounded with good and profitable mines. Messrs. Cullers and Ewart are re-opening an old quartz mine on the Mono road near the Excelsior hotel. We are told that present appearances indicate a good property. McTarnahan and staff went up last week to survey the North Fork mine, and also ditch to convey water to the grounds. Operations will very likely be commenced on the mine soon after the Fourth. From Mr. Scott who was in town Thursday, we learn that the hoisting works will be done in about three weeks. Then the work of sinking the main shaft will be prosecuted at once. The permanent character of the Black Oak mine is now well established, and present returns from the mill are of a most gratifying nature.

HYDE.—From Louis Blanding who returned from the Hyde mine Thursday, we learn that the outlook is very bright. The main shaft on the large lode is down to a depth of 350 feet. At that depth a cross-cut has been run toward the west, showing the lead to be fully 26 feet in width and of very good grade. The parallel ledge is also looking well—it is from 3 to 5 feet in width and a tunnel taps it 100 feet from the surface. This lead is distant laterally from the main one about 150 feet. The ore of this lode is of high grade. About 200 feet south of the main shaft on the large lead, another shaft is being sunk for development purposes. The work of exploration done on this mine in the last three months has proved it to be a splendid property. The mill which is of the improved Huntington pattern is furnished with the blinding rock breaker, which by reason of it crushing the rock very fine, enables the mill to have a capacity of 25 tons per 24 hours. There are two separate engines in the plant, one of which runs

the hoisting works, and the other operates the mill. A feature worthy of notice in the machinery department is the boiler. This is a novel combination of the locomotive and tubular boiler, and gives great satisfaction.

NEVADA.

Bristol District.

COPPER BULLION.—*Pioche Record*, June 30: The small copper furnace at Bristol, erected recently by C. L. Roe, and of which mention was made some time since, was fired up a week ago yesterday, and a three days' run made, the result of which was seven tons of bullion, containing 95 per cent copper, produced from 14 tons of ore. The bullion carries but \$2 per ton in silver. This experimental run resulting successfully, the furnace will be fired up again as soon as it is relined, which, however, may be some weeks, as it may be necessary to procure fire-brick from Salt Lake City. In the mean time ore will be hauled to the furnace from the mine. About 200 tons of ore are mined and are now on the dump.

Cherry Creek District.

WAITING FOR A RAILROAD.—*Salt Lake Tribune*, June 28: Forty-five miles south of Spruce mountain is the well-known camp of Cherry creek, on the line of the old Overland Stage Co. This camp has shipped \$3,000,000 worth of ore. The ores are principally milling ores. The bulk of the mineral is silver, but there is a sprinkling of gold. Below water level the character of the ore changes to base ores, yet running very high in silver and lead, streaked heavily in chlorides. There are thousands and thousands of tons of ore in this camp on the dumps waiting the advent of a railroad to ship them to market.

Garfield District.

THE ARGO.—*Esmeralda News*, June 30: Z. Lyford has been doing the assessment work on the Argo mine, and while so engaged extracted 28 sacks of ore, carrying both gold and silver. Six sacks of the ore are considered very valuable and will be shipped to Selby's for reduction. The other 22 sacks of ore will be worked at the Mt. Diablo mill, Soda-ville.

Hawthorne District.

RICH ORE.—*Esmeralda News*, June 30: The figures \$16,780, show the result of the working of the 15 tons of Pamlico ore crushed at the Kinkaid mill last week. In the last issue of the *News* it was asserted that the result of the working of this batch of ore would "surprise the natives," and if it has not surprised them it certainly ought to. Just think of it, over \$1112 per ton, and the beauty of it is, there is a quantity of the same class of ore in sight in the mine, only awaiting the action of the pick, shovel and stamps. As has been stated all along, the Pamlico is the biggest little mine in the United States, and it is only a matter of time before other mines equally as valuable will be in operation in Hawthorne district. If many of our prospectors had the capital with which to open up their mines, such a stream of gold would be flowing out of Hawthorne district that would soon fill the coffers of many a poor man. As it is, the mines in the district are producing admirably well. One prospector, who has been at work on his claim but a short time, was made an offer of \$7000 for his interest, but he quickly refused the offer, saying that there was that amount of money in sight in the mine.

Tuscarora District.

IMPROVEMENTS.—*Tuscarora Times Review*, June 30: Tuscarora is now on the high road to prosperity and is bound to become one of the most permanent mining camps in the State of Nevada. The developments during the past year in the 400-foot level of the North Belle Isle, as well as those in the lowest levels of contiguous mines, from the deepest point yet reached and extending upward to the surface, have attracted the attention of capitalists from abroad who have invested largely in shares in the leading mines. Having upon several occasions visited Tuscarora in the interest of their investments and to note the developments below ground, they have become fully convinced as to the extent and richness of the ore bodies as well as their permanence. Being far-sighted, practical and competent business men, they foresee that the population of this place will be greatly augmented and as a consequence its needs increased in a corresponding ratio. To remedy the lack of facilities for reducing the large bodies of ore in their mines, the Commonwealth and Queen companies are about to erect a 20-stamp mill in the vicinity of their mines, which will be equipped with the largest and latest improvements in the way of roasting appliances for desulphurizing their ores and reducing the cost of reduction to the minimum. When completed it is thought the mill will reduce the ores at a cost not exceeding \$12 per ton. The site selected for the mill is upon the eastern slope of the Commonwealth property above the Diana hoisting works in Independence gulch, and ground will be broken for the buildings in a few days. The concentrating works of the North Belle Isle and Queen, now in course of construction, will materially add to the wealth and prosperity of the mines and the camp by rendering available the immense number of tons of low grade ore now lying useless on the dumps and in the stopes of all the mines which have been worked for any length of time, and which under the ordinary process would not pay for extracting and working.

Washoe District.

ALPHA.—*Virginia Enterprise*, June 30: The work of sinking the shaft to the 500 level is making good progress.

OVERMAN.—Are extracting and shipping to the mills 300 tons a week.

BULLION.—The south drift from the 600 station is making good headway.

CON. IMPERIAL.—Are making good progress in the work of retimbering the north lateral drift.

ANDES.—On the 240 level are sinking a winze below the north drift and are drifting south on the 350 level.

BENTON.—Considerable prospecting work is being done on the 725 level. The mine is being worked through the Alta shaft.

SAVAGE.—On the 450 level are stopeing ore from the north and south drifts, also from the south drift on the 500 level. They are extracting about 80 tons of ore per day from between the 400 and 900

levels. The average battery assays \$20 per ton. They have bullion on hand and previously shipped for this month amounting to \$20,350.

CHALLENGE.—The joint Confidence raise is progressing favorably and good headway is making in the north drift on the 100 level.

SCORION.—The south drift on the 300 level is out a distance of 353 feet. The material is about the same as heretofore reported.

ALTA.—Are extracting ore from the usual point. The mill and concentrators are kept steadily running. The concentrators are doing good work.

UTAH.—372 level: Opposite the south drift the north drift has been extended 38 feet; total length, 116 feet. The formation is vein porphyry.

BEST AND BELCHER.—El Dorado level—The northwest drift from the main west drift has been extended 46 feet; total, 336 feet, the formation being porphyry.

BALTIMORE.—The work of clearing out the west drifts on the 300 level is about completed. The point where ore was found some months ago will shortly be reached.

WEST YELLOW JACKET.—The northwest drift is in 80 feet. At the bottom of the drift a stratum of blue clay is coming in. In this clay are some rich streaks of chloride ore.

IOWA.—During the past week the south drift from the east drift has been extended 25 feet, giving it a total length of 100 feet. The face is in promising vein material in which quartz predominates.

LADY WASHINGTON.—The crosscuts at points 110 and 210 feet above the 725 level are still in a mixture of quartz and porphyry. A hoisting engine is being set up at the Keystone shaft, which is now down 186 feet.

SEG. BELCHER.—The joint 1300 east drift has been stopped since last report, and a raise started in the south lateral drift from the first raise at a point about 100 feet south of the north line. It is now up nine feet above the top of the drift in fair grade ore.

BELCHER.—The west crosscut on the 500 level is in 35 feet. The face is in clay and porphyry. On the 1300 level the east drift has been stopped. The new hoisting works at the old shaft are nearly completed. They expect to commence work in the shaft about July 1st.

GOULD & CURRY.—Eldorado level—The southeast drift from the top of the upraise from the drain tunnel has been extended 37 feet; total length, 154 feet. This drift is in fair grade milling ore. During the week there has been extracted from the 250 and 300 levels and shipped to the Douglass mill 216 tons of ore; average battery assays, \$23.40.

CROWN POINT.—On the 600 level the raise has been advanced 22 feet. The ground is of about the same character as at date of last report. On the 700 level the southeast drift has been advanced 44 feet; total length, 132 feet. The face is in quartz giving low assays. The quartz is a good deal mixed with porphyry. The drift from the Suro tunnel side is out 300 feet.

HALE & NORCROSS.—During the week they have hoisted 1647 tons of ore from the 600 and 700 levels, and have shipped to the Mexican mill 951 tons; average battery assays, \$32.65. All the stopes throughout the mine are looking very well. No. 1 east crosscut from the 400 level north drift has been advanced 45 feet. They have bullion on hand and previously shipped this month amounting to \$135,200.

OCCIDENTAL.—Upper tunnel: At 150 feet below the upper tunnel in the boiler winze the north drift has been extended to feet; total, 18 feet. Lower tunnel: 75 feet south of the north incline winze the incline upraise has been carried up 20 feet; total, 120 feet. At 150 south of the same winze the south drift has been extended five feet; total, 114 feet. In the winze leading to the lower levels, 50 feet below the tunnel, the north drift has been advanced in feet and the south drift six feet. Extracted 134 tons of ore. Shipped to the Excelsior mill 157 tons and to the Atlanta mill 139 tons. Average assay of wagon samples, \$22.25.

PALMETTO DISTRICT.

LEACHING PLANT.—Inyo Independent, June 30: At Palmetto, over in Esmeralda county, Nevada, a new leaching plant is being put up. Cornish rolls will be used in connection with pans and settlers. It is calculated to work about 15 tons of ore per day. The property is owned by the Catherwood Bros., bankers, of New York. Some very rich gold ore has been taken out. From a claim called the President, Mr. Catherwood, one of the proprietors, recently took a sample of the ore to San Francisco. The sample weighed 93 pounds and yielded \$407 in gold and \$15 in silver, or \$9773 per ton. At the mill and mine 30 men are now employed. The boilers and engine are in place and it is expected work will begin crushing ore about three weeks hence. Palmetto is about 47 miles distant from Alford on the C. & C. railroad, and 16 miles southeast from Piper's ranch.

ARIZONA.

EUREKA DISTRICT.—Cor. Arizona Journal-Miner, June 30: This district is situated about 65 miles west from Prescott, and near the divide between Santa Maria river and Burns creek. The mines of this company, Walters, Smith, Rybon and Wilson, are 12 in number, and situated on the top of the mountain near old Gray Back. The mines of this company are all grouped together in the foot-hills among the cedars, close to a never-failing spring of water, good grass, and easy access by wagon road, close to the big copper property of Lawler & Co., on Copper creek, and on the same mineral belt of the celebrated Hillside mine of Riggs & Lawler, the belt being encased between two large dykes of copper, the one on the west being a good strong vein of copper, carrying from 20 to 30 ounces of silver, owned by John Long and called the Copper Queen; the one on the east being a big ledge of copper and silver, owned by W. N. Kelly, Fred Gaines, and Morrow & Caldwell, and is a fine prospect, carrying copper, silver and lead. The mines of Waters, Smith, Rybon and Wilson had been partially developed by Mr. Waters, the locator, before the Colonel took hold of them, and who induced Mr. Rybon and Wilson, of your city, to take hold with him and bring them to the front by further development, and testing the ores by shipping and reducing them, thereby proving to their own satisfaction the exact value of the mineral therein contained, and from the present outlook of the quantity and quality of the

ores their labors will meet with a reward far beyond their expectations. They are now working seven men, sinking and taking out ore and sending it to the Prescott sampler. Ten thousand pounds will accompany this letter. There are three of the mines that are being worked at present—Silver Queen, Wilson and Hamer. The Silver Queen has a shaft down 80 feet on a strong contact vein, the contact being porphyry and diorite. It is a sulpho-carbonate of lead, carrying from 50 to 100 ounces of silver, and from 20 to 40 per cent of lead. The pay streak is from 18 inches to 3 1/2 feet. The Wilson is a continuation of the same, adjoining the Queen on the south, with a 60-foot shaft of the same ore. The Hamer and Gad has a 30 foot shaft of a higher grade of lead, though not as yet so much in silver, it going about 4 ounces of silver and 60 per cent lead, with a good, strong vein. The ore dump is a beauty to look at, and is increasing very fast as they sink. This belt will be the coming camp of the northern part of the Territory soon. Fred Maroney is working on the Red Cloud, with a good showing of galena ore. Several prospectors are here, and you need not be surprised to hear of some new strikes soon.

BULLION.—Arizona Enterprise, June 30: On the 26th, the Vekol shipped three bars of bullion, averaging 444 pounds, valued at about \$700.

CASA GRANDE.—Another mine in the Casa Grande mining district has been sold to Eastern parties, and Chris. Johnson is the lucky man this time. Chris, has worked long and faithfully to bring the Golden West mine out to the front, and his late strike of a fine body of chloride ore in the crosscut is another chinch for the mines in that district go down. Mr. Charles Eastman is in Casa Grande from his Mountain Queen mine near the Vekol, and reports the tunnel in 265 feet, with abundance of ore. Eastman and his partners will soon commence shipping ore to El Paso. Mr. J. A. Conlee, superintendent of the Monarch mining company, came up from Casa Grande and went to Riverside Wednesday. A rich strike is reported in the face of the 220 foot tunnel on the Silver Monarch mine. This mine is the coming bonanza of Pinal county.

COLORADO.

LAKE CITY MINES.—Sentinel, June 28: The Oneida Chief, owned by Reynolds Bros. was started up June 1st. The assays taken are said to average about 1000 oz. Considerable work will be done on the property the coming season. A large force will soon be put to work on the Montecello, owned by Reynolds Bros. Ulica, N. Y., and managed by H. E. Wright. A crosscut of 150 feet will be run, which will give employment to a large force. The Park View people have stopped sinking and begun a crosscut tunnel at a depth of 50 feet. This is a very valuable property, and a large force of men will be put on at once. The "Seward County" mine, owned by T. E. Clauson, is expected to resume operations soon, as Mr. C. has determined—now that the D. & R. G. R'y has begun to build—to put a large force at work and develop this unusually valuable property. E. B. Coleman is one of the owners of the Hamilton mine in Carson camp and is here to make some examinations, with a view to putting on a large force at once. This property is one of the richest in that locality. Over 15,000 tons of ore was taken out last season which averaged over 1000 ozs. The ore output of Lake City, beginning with the completion of the D. & R. G. R'y, say Oct. 15 to the end of the year, is estimated at fully 30,000 tons, possibly more. It is astonishing to notice the amount of ore taken out and awaiting shipment. Lake City certainly has the largest and richest mining territory tributary to her of any camp in the San Juao. The developments this season will be extensive and add greatly to the output of the camp. Good buildings have been erected at the mine, including a spacious engine house. They have a 15 horse-power boiler, pump, hoister, and other machinery. Much more is to be added and it would not surprise us to see the Hamilton become one of the heaviest producers of high-grade ore in the State.

DAKOTA.

GRAVEL.—Pilot, June 28: M. R. Phillippi and Lou Wintenburg came down from where the Hermosa Hydraulic Co. is working on Monday, and report that the two weeks' cleanup, which occurred Sunday, amounted to \$400. But few realize that so much money is being taken out of the ground within a few miles of Hermosa.

PLACERS.—Deadwood Pioneer, June 28: Placer miners have had no reason to complain of an insufficient supply of water this season. All streams have run bank full for the last three or four weeks, and the supply of water has been all that the most exacting gum-boot miner could desire.

IDAHO.

PINE GROVE.—Inter-Idaho, June 28: We obtain from Mr. John M. Banfield some figures relative to the present prospects of Pine Grove, and what it really is now, that represent the present actual condition of affairs there, from which every one can deduce their own ideas of its future. Pine Grove is one of the mining camps which are not "coming," but has already come. The population numbers about 200, and there is one 20-stamp mill. The company employs about 70 men, and need more machinists and carpenters. The Gold Hill M. & M. Co. is composed of St. Louis men. They expect to start the mill in three or four weeks. Frank Andrews is running the Franklin mine and shipping ore to Rocky Bar. The ore goes from \$40 to \$90 gold. Sloan has leased the Valley Buck, and is taking out high-grade ore. The mines generally are all looking well and several are shipping ore.

THE VENUS MINE.—Wood River Times, June 27: Vladislav Domsli, from the East Fork of Wood River, says he is being doing deadwork since last fall, but that he is now in where he can soon begin extracting ore. After running the tunnel 190 feet he cut the vein and found it quite hard, but showing a streak of copper 1 1/2 inches wide. By drifting about 50 feet from this point, he expects to cut the continuation of the ore chimney struck above, and which yielded high-grade ore. He will then begin stopping as soon as the vein is drained.

ROCKY BAR.—Cor. Idaho Statesman, July 1: The mill and other buildings on Red Warrior gulch are going up speedily and they look well. This is

the Wide West property, destined to be an important factor in determining the prosperity of this camp. The Idaho lode is one of the oldest in this camp and runs parallel with the Vishnu. It has not been worked until recently for many years. Mr. Fitzgerald, one of the proprietors, struck a fine body of ore there on Monday of last week. The Ophir mine is getting out seven or eight tons of very promising ore each day. The superintendent, Mr. Foljamber, will have a mill test of from 60 to 75 tons made within the next fortnight at Jake Reeser's mill. If this should be a success, the New York company will at once proceed to put up a mill. The force of men at work upon this lode has been small thus far.

ORO FINO.—Idaho Avalanche, June 30: The purchasers of the Oro Fino group of mines have registered in London under the name of the Oro Fino Limited Co., by which name this famous group of producers will hereafter be known. Judging from the way the owners are pushing matters Silver City will soon be a lively camp. The superintendent here is quite reticent about what the company proposes to do, but the fact that a new millsite has been located in town and the work of preparing the same for a mill been begun, 1500 cords of wood advertised for, and bids for hauling 150,000 pounds of mill machinery asked for, tells more than talk. We learn that he is also making arrangements to put up a bucket tram to transport ore to the mill from the mine, 1 1/4 miles distant.

SALE.—It is too early yet to learn the particulars, but we take pleasure in announcing that a sale has been about consummated here almost equalling the Oro Fino transaction made a few months since. The famous Poorman group of mines, some 12 in number, among which are included the Belle Peck, Belle Peck Tunnel, Poorman, Silver Cork, North Empire, Oso and others, by this sale will pass into the hands of a syndicate of English capitalists, who will at once begin to work them for all they are worth. This great combination of mines, placed under one management, with abundance of capital, will be likely to make things very lively on old War Eagle mountain.

SEAFOAM.—Cor. Idaho Messenger, June 30: Many of our own people, as well as many of the strangers, have gone into the Seafoam country. That seems to be the objective point this season. The reports from there are very favorable as to the mining outlook. A large proportion of the old discovered quartz veins there are owned by men in this vicinity, either by purchase or discovery, and we are all more or less interested in the success of that end of Custer county. Its distance is only 30 to 40 miles from Bonanza, over a fair mountain trail. A large number of prospecting parties have purchased supplies at Bonanza and Custer for the new El Dorado. It is understood that arrangements have been made with the Dickens-Custer Co. to work the milling ores that may be brought in during the summer from the Seafoam and neighboring districts. All who return from there speak in glowing terms of the prospects of the new camp. Recent explorations on a number of the claims, prove that the ore veins are not confined to mere surface croppings, but that they go down in regular veins of rich ore, and can be traced over the hills from one location to another.

MONTANA.

RETURN OF GOLD HUNTERS.—Inter-Mountain, June 25: "Punk" Bartlett and Lyndon got back from the north last night, and Doc Gleason will be in with the team some time to-day. Boyles, who led the expedition, returned with him. Bartlett says they did not succeed in getting to the rich diggings which Boyles told them of, where they had expected to find placer mines which would enrich them in a few weeks. They got away up into the northernmost part of the territory and may have been across the line into the British possessions. At any rate they got where the Indians were altogether too numerous for their peace of mind. They were placed under surveillance by the Piegans and required to report twice per day. They were practically under arrest and were not permitted to proceed on their way. There was no use staying where they were, as they could do nothing there and were in danger of losing their stock, so they turned back. They are still firm in the faith that a golden land lay just beyond, and may perhaps make another attempt at some future time.

CASTLE DISTRICT.—Butte Inter-Mountain, June 30: The Castle mountains lie south of White Sulphur Springs, between the heads of Smith river and the Musselshell. The mines are located on the Musselshell side of the group and extend over a distance of seven miles.

THE TOWN OF CASTLE contains about 100 residences and business houses and is about two miles below the Cumberland mine, the original discovery of the camp, which was taken up by the Hensley Bros. in 1886. Very little was known of the camp until August of last year. Since that time over 400 locations have been recorded and a large amount of development work done. The Cumberland Mining and Smelting Co. developments are two shafts—one 125 feet deep and one 150 feet deep, with levels run for a short distance and show a fine body of carbonate ore. Returns from a shipment made to the Aurora smelter netted them \$30 per ton. The general run of their assays vary from 25 to 35 ounces silver and from 40 to 65 per cent lead. They are now at work grading for their smelter, the machinery for which was shipped by Frazer & Chalmers of Chicago, on the 19th of this month, and if they get clear weather enough will soon have a 40-ton stack running at home. The American, owned by Hensley Bros. and J. D. Rhoades, is really the only dry ore yet struck in the district. Developed by a tunnel 150 feet on the lead and a shaft down 40 feet they have a three-foot contact vein between slate and granite, and have had no assay of less than 150 ounces. Several extensions of the American have been located, but no development work has yet been done. The Yellowstone, owned by Hensley Bros., located about one mile from the new town of Robinson and three miles from Castle, is a contact vein between lime porphyry, and development shows a very large body of about the same grade and character of ore as the Cumberland. This mine is under a bond to Helena parties for \$50,000.

THE HIDDEN TREASURE, a quarter of a mile from Robinson, owned by Dunn & Donovan, have a shaft down 100 feet and have a very fine ore.

THE GREAT EASTERN, owned by Chapin & Lewis, have a shaft down 200 feet. At many points

of the shaft short levels have been run and all show a fine body of ore, the same character as that in the Yellowstone and Corliss.

THE T. V. POWELL, owned by Hensley Bros., Higgins & Chaffee, is developed by a tunnel 120 feet to the top of the lead at a depth 80 feet. It shows a carbonate ore which carries from 25 to 100 ounces of silver and 30 to 40 per cent of lead.

THE SHANROCK, owned by Graham & Currie, one mile from Robinson, is developed by a shaft 50 feet deep; have a three-foot ore body carrying galena and silver from 30 to 50 ounces.

THE MOTHER LODE, owned by Martin & Orschall, has a shaft down 50 feet and quite a large ore body, which assays from 50 to 70 ounces of silver, 50 to 60 per cent of lead and one-half ounce of gold. Very few of the prospects here show any gold. The Belle of the Castles and the Blue Belle, Black Hawk, with a number of others, have a fair showing for the amount of development work done.

THE ALICE, located 12 miles from Robinson toward the springs, is certainly one of the best properties in the district. It is now being operated by the Barker & Davis, under a lease and bond for \$100,000.

NEW MEXICO.

BANNER.—Silver City Enterprise, June 29: The Banner mine gives promise of making one of the big mines of this section. The ore has been continuous and occurs in large bodies. The development is progressing steadily. Malcomb McGregor brought over 60 tons of third-class ore from the Boss mine this week, which was worked at the Bremen mill with satisfactory results. J. B. Malone was from Pinos Altos this week making arrangements to go down 35 feet further on his claim, having already sunk 90 feet. It is probable that in the near future the Bremen mill will pass temporarily under the control of the Aztec company, and will be run on ores from the Aztec mines. Messrs. Crawford and Milstead contemplate giving the mill up in a short time, as they are running short of ore. M. W. Bremen has purchased the Wynan interest in the Yankee Girl, at Gold Hill. The mine is now owned by Goodwin and Bremen. It is one of the finest prospects in the whole country, and will, no doubt, prove to be a payer. George Goodwin will have charge of the development of the mine. Last week Jake Long struck a 15-inch vein of ore in the Osceola, a northern extension of the Deep Down, at Pinos Altos, which is very rich in free gold. A good portion of the vein will average about \$1000 per ton, while the whole of the vein is very rich.

PLACERS.—Silver City Enterprise, June 29: The placers which were spoken of last week as having been recently struck in some part of the Pinos Altos mountains, have been located on Bear creek just below the mouth of Webster gulch, hence, the location is no longer a secret. Old timers have washed gold there before. The dirt pays about ten cents per pan, which is quite good. The gold is heavy and of a splendid quality. The boys who have the placers located are taking out water, and fortunately they have a sufficient amount for present purposes, and are preparing for a season of active work. The information that M. W. Bremen has been made agent for the Bremen Mining Co., will be gratifying news to many people of this section, as it foretells the resumption of operations in the Bremen mine. Quite a force of miners will be put to work as soon as the right class of men can be secured.

TO START UP.—The Telegraph mines on the Gila river will be started up by the new company as soon as preliminary arrangements can be settled. Five more stamps will be added to the mill, making 15 in all, and a wire tramway will soon be erected to convey the ore from the mines to the mill, which has heretofore cost \$7 per ton to haul. The mill is run by water power, and as the ore occurs in large bodies, it has been estimated by good authority that eight-ounce rock can be mined and milled at a handsome profit.

OREGON.

RICH STRIKE.—Bedrock Democrat, June 27: A. Geiser came in from Connor creek yesterday. He reports a rich strike having been made in the mine at that place two or three days since. Mr. G. says that the new find is a vein of ore four feet thick, and that the gold fairly glistens all over and through it. The Connor creek is and has been one of the "big" mines of Oregon for some 12 or 15 years.

WALLOWA MINES.—The mines of the Wallowa are assuming considerable prominence to mining circles. The principal property of that section is the Wallowa Silver Mining and Tunneling Co., under the general management of T. L. Brophy, an experienced and practical miner. Work has been in progress on this mine for the past 10 months, and the developments thus far are beyond the most sanguine expectations. The main tunnel is in about 200 feet and there are 500 tons of ore on the dump. Assays average all the way from \$70 to \$2000 a ton. Two carloads of the ore was shipped to Portland a few days since and awaits reduction.

UTAH.

REVIEW.—Salt Lake Tribune, June 29: There has been a slight relief in the lead market, which has brought ores in freely during the past week, but the improvement in price was so small that there is scarcely any relief in the general gloomy feeling. The ill gal importations of Mexican lead ores are what make the main slaughter of the market. The receipts in this city for the week ending June 27th, inclusive, were to the value of \$199,654.18, of which \$103,217.27 was bullion, and \$96,436.91 was ore. For the previous week the receipts were \$71,976.19 in bullion, and \$49,794.28 in ore, a total of \$121,770.47. The output of the Ontario for the week was of bullion, 17,283.40 fine ounces; from ore sales, \$22,863.62; total, approximately, \$40,147.02. The Daly product for the week was bullion, 19,645.99 fine ounces. Fine bar receipts in this city for the week were to the value of \$63,794.80; base bullion, \$23,008.60; copper matte, \$3246.05. The Hanauer smelter produced for the week bullion valued at \$11,280; the Germania, \$8622.44. Ore receipts in the city for the week were to the value of \$55,578.54 by Wells, Fargo & Co.; \$31,650 by McCormick & Co., and \$9208.35 by T. R. Jones & Co.

MECHANICAL PROGRESS.

Progress of American Iron Industries.

Mr. Swank's last annual report of the industries of this country is awakening a most lively interest in the activities of this country, throughout Europe, and particularly in Great Britain. The *English Colliery Guardian*, in alluding to the facts set forth in that report, says that "the progress of American industry is one of the most striking facts of modern times. No country has ever developed her internal resources so rapidly before. Particularly is this the case as regards minerals and iron and steel manufacture."

"Mr. Swank's figures," the *Guardian* continues, "demonstrates that the United States continues to lead the world as a producer of Bessemer steel." The circumstance that the demands of the railroads in America for iron keep very heavy, and that in England steel for shipbuilding has largely superseded iron "efficiently," remarks this authority, "accounts for the relative positions of the two processes (the Bessemer and the open-hearth) in the two countries."

America's steel rail production the same critic denominates as "a most striking fact" the circumstance that the steel rail production of the United States at the present time is more than twice the extent of its output in our own works, and concludes: "The position which America has attained as an iron and steel and mineral producer should not be cause wholly of envy, but rather of admiration, for is not America the child of the mother country?"

The British Iron and Coal Trade Review comments upon "the wonderful advances which that great country (America) has made in recent years in the manufacture of iron and steel, and in that spite of the fact that it has practically no export business such as ours. But up to the present the United States has not felt the need of an export trade, as within its own territory there are consumers for all the iron and steel that is made there, and a good deal more besides."

"Mr. Swank has a surprising record to present," continues the Review, "as to the increase of the trade of 1887, which was undoubtedly the most active year that the American iron trade has ever experienced. The year 1886 was counted a wonderful period, but 1887 far exceeded it, and in no leading industry has such marked progress ever been recorded as is now reported in connection with the iron and steel trade."

"One thing," says the editor, "in this return is very remarkable—it is that in face of the vast increase in the consumption of steel the output of rolled iron should increase. This would show that the puddling furnace is more than holding its own against the encroachments of steel."

MANOANESE STEEL VS. IRON.—The proposed introduction of bolts and nuts, bars, plates, etc., from a tough, soft, manganese steel, in place of iron, has met with much favor, their alleged superiority having been abundantly proved. In London some interesting tests of a severe and decisive character have been made, with a view to ascertain whether bolts of such material were really strong against the very heavy stresses and strains to which they are sometimes subject in practice, and to determine whether the steel of which they are made would withstand bending, hammering close, and severe treatment in various ways, or whether the steel would only withstand heavy stresses slowly applied. Under these trials the metal exhibited a toughness unsurpassed by any other, being easily nicked and bent round away from or closed up at the nick. Bolts up to $\frac{5}{8}$ -inch were tested by holding the nut fast in a vice, and then hammering the bolt until it was bent down at the screwed part through an angle of 130°, then taken out and doubled down and closed up with a heavy hammer on an anvil; but though the screw threads were thus jammed up and compressed upon each other on the inside of the head, and opened out to double their pitch on the outside, the steel did not break. Its value for piston and other rods, and also in slabs for forging and welding into screw propellers for torpedo boats, likewise seems assured.

DRAWING CANAL BOATS WITH A LOCOMOTIVE.—The experiment of drawing canal boats with a locomotive engine was recently tried by officials of the London & North Western railway with great success. A short track of eighteen inches gauge was laid along the tow-path of the canal and a little locomotive weighing about a ton, drew a number of boats at the speed of six or seven miles an hour with ease. There are still a few canals left in this country upon which the substitution of the locomotive for the mule might be tried to advantage.

RUSSIA IRON.—Probably the only secret process which has been kept inviolate, and for ages openly defied the world of science, is the iron trade of Russia. The secret of making Russian sheet iron is owned by the Government, and is such an immense monopoly that it is currently supposed to defray the entire expenses of the Government. The works constitute an entire city, isolated and fortified against the rest of the world. When a workman enters the service, he hides a last farewell to his family and

friends, and is practically lost to the rest of the world. He is never heard from afterward, and whether he lives or dies, all trace of him is forever lost. There have been several desperate attempts made to steal or betray the secret, but in every instance it has resulted in the death of the would-be traitor. In one case a letter attached to a kite, which was allowed to escape, was picked up by some peasants, and, despite their protestations that they could not read, they were at once put to death by the guards to whom they delivered the letter, and it was afterward decreed that the guards themselves should pass the remainder of their days within the works. The wonderful properties of this iron are so well known that it is unnecessary to enlarge upon them.

Superseding Steam.

A Novel Application of Naphtha.

A test, says the New York Herald, was made on the Harlem river on Thursday last of an invention which, it is claimed, will furnish speed for small craft without steam, and with an entire absence of heat and dust. It is well known that the loss of energy is less in liquid fuel than in coal, the only difficulty in the way of utilizing the former being its volatilization and the danger of an explosion. The invention in question, and in which naphtha is used both as motive power and fuel, claims to have overcome these difficulties.

In the how of the boat a hulkhead is perforated to admit sea-water, which circulates around a copper tank fitted with a tap screw. In this magazine liquid naphtha is stored, and from the reservoir a feed and two exhaust pipes lead to a retort and, to another hulkhead, which contains the mechanism. The engine and boiler consist of a series of spiral coils, beneath which is the steam chest, vertical cylinders and piston rods. Forward of the retort is an injector which feeds naphtha vapor to the furnace, and a damper admitting fresh oxygen to aid consumption. By this arrangement the pressure of gas is increased or diminished, and the speed regulated. At the lower end of the retort is the combustion chamber which admit the vapor. When ignited the flame reaches every part of the spiral, boils the naphtha, and generates a pressure of 60 pounds per square inch in a few minutes. Only about six per cent of the gas generated it consumed as fuel, the remainder, after being utilized, being condensed in the exhaust pipes and entering the reservoir again as liquid naphtha. The engine, after being once started, runs itself as long as there is a supply of naphtha in the tank, and as the feed fails to supply liquid the fire goes out automatically, and there can be no explosion.

The launch on which the test was made was 30 feet long, and designed to develop six-horse power. At a pressure of 60 pounds a speed was gained a little under eight knots. The boat consumed about two gallons of naphtha an hour, which at the market value to-day is a cost of 20 cents. Any person can learn to run one of these engines and to steer at the same time. The entire engine and fittings are less than one-fifth the weight of others of the same power, and occupy a comparatively small space. Besides this, there are no cinders or ashes.

BULL'S METAL.—A new malleable alloy of the bronze kind has been produced by Mr. John Bull of London, by a process for which it is claimed that it secures the introduction and admixture of the component metals in accurately controllable and definite proportions, forming true alloys of high strength and uniformity. Some of the specimens of cast, rolled and turned rods show remarkable uniformity in extension throughout the whole length of the test part, and not so marked a contraction in one spot only, as is usual. In one of the test specimens the elastic limit was reached at 24 tons per square inch, above which the metal suddenly extended about two per cent; it then dropped a little in tensile resistance and recovered, as in the case of mild steel, further extension being very slight up to 30.6 tons. After this the extension was uniform up to the point of rupture at 34.76 per square inch.

FINE WIRE DRAWING.—A correspondent of the *English Mechanic* writes as follows in a recent issue: "The Asiatic wire drawers have very long ago used castor oil in preference to any other kind. Their dexterity is surprising, the wire for the Trichinopoly chains of gold and silver being like hair, and every good workman draws his own. A man made me a plate for the fine ganges from a flat rasp of English steel, which I still possess. He drew copper, zinc and brass equally well. Castor oil, being one of the cheapest in India, is used to soften harsh leather shoes and ropes. The fresh leaves of the castor oil tree, too, are gathered, bruised and rubbed in the hand, then stuffed tightly into stiff European boots, male or female, and so remain all night; the leather then becomes quite supple. For feeding large drills, I like this oil mixed with soft soap."

PROPELLER BLADES.—From experiments made last year in the Danish navy it appears that there is but little difference in the efficiency of the two-bladed and four-bladed propellers, the same blades being used in each case, so that the loss of one-half of the propeller surface was balanced by the lessened friction. At speeds greater than twelve knots, however, the vibrations with the two-bladed propeller was excessive.

SCIENTIFIC PROGRESS.

THE ACTION OF WATER UPON LEAD PIPES.

Dr. W. R. Thomas, in a recent lecture upon poisoning from drinking water gave the rationale of the action of water upon lead in pipes as follows: "Water generally contains a certain amount of carbonic acid. This acid acts upon the inner surface of the pipe, forming an insoluble internal coat of oxy-carbonate of lead, which effectually prevents the water from further acting upon the pipe. Hence old pipes which have been down for years are far less dangerous than new ones. Water which contains lime salts, as the carbonates and sulphates, also assist in forming an internal insoluble coat, as the carbonates and sulphates unite with the lead. New pipes are apt to be acted upon by the oxygen which the water contains. A soluble oxide is formed, which contaminates the water. The nitrites, nitrates and chlorides found in water contaminated by sewage are very injurious, as they dissolve the lead; so also peat and other vegetable matter have a similar deleterious effect. The Sheffield water from a certain source is acid, and most certainly dissolves the lead. The water in other towns has had a similar effect upon the lead. For some time the inhabitants of Keighley suffered from plumbism, as we do now, from drinking-water. Mr. Jarman of Huddersfield, recommended the authorities of Keighley to use limestone to counteract the acidity of the water. This was placed in conduits and the water was allowed to pass over it. They found at Keighley that it has been necessary occasionally to add quicklime to aid the limestone, especially in summer when the water is scarce. This plan, which has been adopted at Keighley, and found to succeed, is now being tried in Sheffield, and I trust it will be equally successful here. It is a matter of vast importance to the town of Sheffield, as the drinking water containing lead is now giving rise to a great amount of disease and suffering."

MAN IN HIS RELATION TO COAL.—The last of a course of six lectures upon scientific subjects, which have been delivered last winter at the Brooklyn Institute, was given on March 1st, by Professor J. S. Newberry, before a large and appreciative audience. His subject was "Man in His Relation to Coal." The lecturer gave an extended history of the discovery and use of coal, and its effects upon civilization. "The growth," he said, "of industrial business is the distinctive feature of modern life, and the cause that has maintained and sustained the mechanical sciences is coal. Should our supply of coal cease, all the wheels of industry would be stopped and we would soon go back to the dark ages. The force given out by a ton of coal is equal to the force exerted by six men and a boy throughout a year. Coal was an element entirely wanting among the ancients. The English coal mines have been the secret of British wealth and commercial supremacy. English statesmen acknowledged this, and in speaking of the power of their country invariably connect it with her coal production. The coal and iron industries of a country are inseparable, and it is fortunate for us in America that there is, to all appearances, an inexhaustible supply here of both of these precious minerals."

DUST PARTICLES IN THE AIR.—Mr. John Aitken, a well-known investigator of the atmosphere, has recently made a series of experiments on the number of dust particles in ordinary air. So far his results show that outside air, after a wet night, contained 521,000 dust particles per cubic inch; outside air in fair weather contained 2,119,000 particles in the same space, showing that rain is a great purifier of the atmosphere. The air of a room was found to contain 30,318,000 particles in the same space; that near the ceiling containing 88,346,000 per cubic inch. The air collected over a Bunsen flame contained no less than 499,000,000 particles per cubic inch. The numbers for a room were got with gas burning in the room, and at a height of four feet from the floor. These figures, though not absolute, show how important is the influence of a gas-jet on the air we breathe, and the necessity for good ventilation in apartments. Mr. Aitken remarks that there seem to be as many dust particles in a cubic inch of air in a room at night when gas is burning as there are inhabitants in Great Britain, and that in three cubic inches of the gases from a Bunsen flame there are as many particles as there are people in the world.

UTILIZING SUN HEAT.—One of the most interesting and practical methods of utilizing the heat of the sun is that recently invented in Salem, Mass. The arrangement consists of a shadow box, the bottom of which is of corrugated iron, and the top of glass. This is placed outside the building in such a position that the sun shines directly upon it; the heat rays of the sun pass through the glass and are absorbed by the iron, heating it to a high temperature, and by a system of ventilation a current of air is passed through the apparatus and into the room to be heated. By this means the air has been heated on sunny days to about 90° Fahr. by passing over the iron.

ELECTRICAL PROGRESS IN 1887.—The *Electrical Review*, in a recent review of the progress of electrical science during 1887, says: "Little was added to our knowledge of electricity dur-

ing 1887, but there was a remarkable development of its practical applications. One of the most important scientific discoveries was that sparks in tubes dissociated iodine, bromine and chlorine. Immense improvements have been made in the construction of dynamos, motors, accumulators and secondary generators, and in consequence the electric lighting and working of railroads and tramways has entered upon a commercial and useful stage. The application of powerful electric currents to smelting, as in the Cowles process for producing aluminum, and to welding, as proposed by Elihu Thomson, is gaining rapid progress, while the use of enormous dynamos for the deposition of pure copper from impure ores is gaining ground with giant strides.

CONVERSION OF HEAT INTO ELECTRICITY.—Messrs. Hurlhausen and Nerst have recently performed an experiment which is very curious from a scientific point of view. On placing a thin sheet of metal in a magnetic field and keeping its two extremities at unequal temperatures, they remarked that the extremities exhibited a very feeble, yet appreciable difference of potential. Moreover, the direction of the current varied according to the direction of the lines of force of the magnetic field. The experimenters operated with a plate of bismuth, 5 centimeters square and 2 millimeters in thickness placed in a field of 5,000 units. The difference in temperature was obtained by placing against the ends of the plate two sheets of mica, one of which was dipped into cold water and the other was heated by the flame of a gas burner. Under such circumstances, a difference of potential of 0.00125 volt was obtained.

A REMARKABLE TELEPHONE.—The Hartford *Courant* remarks: The adjutant-general's office at the capitol has been connected with the room of the quartermaster-general on the third floor by means of a Hall short-distance telephone line. The wire employed is composed of six strands of steel, wound around a cord covered with a preparation of paraffine, which prevents induction. No battery is required, and the voice of a person standing in the room at a distance of twenty feet from the instrument can be distinctly heard at the other end of the line. By means of this remarkable invention the adjutant-general and his associates can carry on a conversation with those connected with the other departments without leaving their desks. The new telephones have been used with great success in other cities. The limit is five miles, but the inventor hopes to exceed this in the near future.

WHERE PHOSPHOROUS AND MANGANESE ARE IN BASIC PIG-IRON.—According to Herr C. Reinhardt, the proportion of phosphorous and manganese in basic pig-iron is almost invariably greater at the edges of a section than it is in the center. In the case of slowly cooled gray cast iron the quantities of phosphorous and manganese vary throughout the mass, but appear to do so together. In a mass of the metal, phosphorous is very unevenly distributed in the various layers, and its amount appears to be greatest at the surface. The same may be said of manganese, and with a rapidly cooled sample both metals are found in the largest proportion, not only in the surface layer, but upon the whole exterior surface of the pig-iron.

EDISON AND FLYING MACHINES.—Mr. Edison is now working on an electrical flying machine which the Spanish Government has commissioned him to construct for the purpose of observation in time of war. The lifting and propelling machinery will consist of revolving fans to which power will be supplied through a wire connecting with an electric dynamo on the earth. No doubt aerial navigation to the length of a wire is practicable, but inventive genius will hardly be content to rest thus circumscribed. Man certainly will yet be able to soar through the air as freely as the feathered portion of creation.

THE CURVES OF FISH.—A paper was read at the recent meeting of the American Society of Mechanical Engineers by Mr. Parsons, on the subject of the "Area Curves of Fish," which developed some interesting data, which may prove serviceable to ship builders. It was claimed as an invariable law in the natural formation of fish, that the cross section of greatest area in the fish was always found to be at exactly the same relative distance from the tip of the snout, thus indicating a constructive law of great importance.

THE EARTH CRUST UNDER THE SEA.—The attention of the French Academy of Sciences has been drawn by M. Faye, the eminent astronomer, to the apparent geological law that the cooling of the terrestrial crust goes on more rapidly under the sea than with a land surface. From this he argues that the crust must thicken under oceans at a more rapid rate, so as to give rise to a swelling up and distortion of the thinner portions of the crust; in other words, to the formation of mountain chains.

When vessels or timbers sink to great depths in the ocean, the pressure is so great that the water is by this means forced into the pores, and the wood becomes too heavy to rise again. It is the fact of this same pressure that makes it impossible for divers to descend to any great depth.

GOOD HEALTH.

State Board of Health.

The report of the State Board of Health for May furnishes returns from 90 cities and towns, which give a mortality of 1035 in an aggregate population of 723,950. This average of death-rate indicates a very favorable condition of public health throughout the State, being a percentage of only 16.8 per annum. When this is contrasted with the aggregate mortality of the Eastern States, the great salubrity of California becomes notably favorable.

In the list of fatalities consumption leads, numbering 174. Of course a large proportion of these cases owe their origin to an Eastern climate, the parties having come to California to improve their condition.

Pneumonia comes next, numbering 72, a decrease from the last report, but giving more than a general average for the month of May.

Diphtheria claims 36 deaths, 15 of which occurred in San Francisco, but not more than its proper average according to population.

Bronchitis was fatal in 25 cases; congestion of the lungs, 14; orp, 12; scarlet fever, 9; typhoid fever, 28—a slight increase over last month's report. The dreaded and deadly

Cancer

Is charged with 30 cases, 23 of which are placed to the credit of this city. The very large excess of cancer cases in this city over other portions of the State is due to the fact that nearly all persons who are attacked with this malady, and who can afford the means, come to San Francisco for relief, but generally too late to be of any avail.

Cancer Can be Cured.

We are in the frequent receipt of letters and inquiries asking if the party in this city, to which we have made such frequent reference, still continues in successful practice, and whether we still have as much confidence in her skill as ever. We invariably answer in the affirmative, for cases of successful cures are constantly coming under our notice—some of which are fully as remarkable as any which we have heretofore noticed.

A few weeks since we met a lady from Victoria who was then under treatment for cancer on the tongue. The case had been pronounced one of unmistakable character by the leading physicians of Victoria, who could give the patient no assurance of relief. By the advice of friends who knew Mrs. Dr. Cook she came at once to this city, and in due time returned home a well woman, without submitting to either the knife or plaster. Constitutional treatment with some simple healing salves were the only remedies employed. It stands to reason that a cancer thus cured is cured for all time, while the application of the knife or plaster, without constitutional treatment, simply aggravates the trouble in 19 cases out of 20.

There is a gentleman from Victoria now under treatment for cancer under the tongue, sent here by this same lady. His malady has made great progress, and but little encouragement was first given of any possible help; but the symptoms have since become highly favorable, and there is now a strong probability of a successful issue.

There is another case to which we would briefly allude of a very elderly lady in New Bedford, Mass., in a family in whose welfare we have long felt a deep interest by reason of old acquaintance. Contrary to her usual custom, Dr. Cook allowed herself to be persuaded to do what she seldom does—send remedies with written instructions for use without personal interview. The case was one of long standing—the patient, in the opinion of her physician, being too old and feeble to endure a surgical operation. The remedies were sent, and her physician had the manliness to watch the case, and when he saw it was fully cured, had the independence to say so and write to that effect in a letter of congratulation which he addressed to Mrs. Dr. Cook. There was no hesitation in pronouncing it a case of unmistakable cancer.

If the physicians of this city would drop their cruel and antiquated system of medical ethics and adopt the course pursued by the New Bedford physician, the monthly reports of death from cancer here would dwindle to the very lowest scale of mortality of any in the long list of human maladies. But how can we expect such a result so long as respect for medical ethics is held more sacred than that for human life?

If the faculty would let patients exercise their own discretion in choosing a physician in this special malady it would soon almost disappear from this city, and in this connection we would repeat the statement which we have before made, that no person has ever applied to Mrs. Cook in the early stage of the disease who has not been permanently cured. We have had several such cases of failure reported to us; but in every one we have found them to be without foundation. We will publish any such case of failure that is proven to be genuine. It is true she has lost many cases, but not one which has not been treated for a greater or less length of time by other physicians, while she has cured great numbers who have been given over to die by others. We have given these three cases as a sample of the many recent ones to which we have not yet made any reference. We dwell at this length upon this subject because of our interest in humanity, and we know we have the secret sympathy

of many physicians, who dare not speak out their honest convictions because they know if they do so they go counter to the ethics of the profession, and will be made to suffer for it. What we have done is without pay or hope of reward. If this press would take up the matter much good would be done. One of our leading dailies recently sent a reporter to interview us. He was introduced to the doctor and a number of her patients, was thoroughly satisfied that we were correct in this discussion, and wrote out a column fully endorsing the same. The article was submitted to the managing editor of the daily, who refused to insert it without the payment of one hundred dollars. He was refused even one hundred cents, consequently this article never saw the light. Many lives might have been saved by such an endorsement. But no, the slimgy dollar was more to that journal than human life.

PREVENTION OF SCARLET FEVER.—Sulphur is recommended as a preventive of scarlet fever. I think it might be useful, but the standard specific for that purpose is belladonna in some form, allopathic or homeopathic. The latter form is easier to manage with children, as it can be given in sugar pills. Belladonna fulfills three purposes. It is a preventive. In a case where the attack of fever is inevitable and cannot be prevented, it is then a preparative and palliative, mitigating the severity and danger of the attack when it comes. It is also a specific remedy for the disease. As soon as it is suspected that a child has been exposed to scarlet fever, four or six belladonna sugar pills, such as are used for homeopathic medicines, should be given morning and evening until the time is passed when the disease should have appeared. If one prefers allopathic treatment, let him not fail to obtain directions from a physician as to the dose to be given. The remedy should not be used carelessly and unadvisedly, but it is the specific for scarlet fever, whether the object sought is prevention, mitigation, cure or avoidance of unfortunate after effects, such as affections of the ear or eye.—J. P. Robinson.

CREMATORIES.—It cannot be denied that cremation is a growing practice. Crematories are beginning to pay expenses in this country, and at the crematories of Europe there were 14,000 incinerations last year. There are 22 crematories in Europe, of which 10 have been built within the past year. There have been 600 incinerations in Germany and 800 in Italy. There are seven crematories in the United States, and six in progress of construction. One will soon be constructed for this city.

USEFUL INFORMATION.

A VALUABLE PLANT.—The espinosilla, or thorn plant, says Marchal Oropesa, a well-known Mexican naturalist, is native to Mexico, and abounds in various parts of the republic, principally near this capital, at San Angel, Texcoco, Santa Fe, etc. It is one of those beautiful wild plants which adorn the plains of Mexico, and it is found particularly in cold, dry spots. It has been thus christened because on touching it a sensation is felt similar to that which a plant covered with thorns would produce. The Aztecs lacking soap—so necessary to their health and happiness—found its substitute in the espinosilla. They agitated a bunch in water and it produced a lather, with which they washed, using the plant as a scrub-brush. Even to-day it is used by women as a hair preservative, having extraordinary powers in that direction. But its most useful application is as a medicinal agent to fight fevers, as it is an excellent diaphoretic. Its ancient name is beautiful. Holtz-it-il-xochitl, a compound word. Holtz-it-il—humming-bird, and xochitl flower; thus translated being flower of the humming bird. It is a perennial plant of variable height, but never more than three feet in height; of a pivotal root, rather flexible, of white surface, corrugated, from which spring secondary roots, thin and separated. In general, the plant is rough and thorny, more so as its age increases. The taste is bitter, especially of the leaves, but the root has two tastes; when first tasted being sweet, after which it is bitter.

LIFE-SAVING ROPES.—The legislature of New York passed a law in 1887 requiring every hotel keeper in the state to keep a life saving rope in every room in his hotel; but thus far the law has been practically a dead letter. Of 246 hotels recently examined in the city of New York, 228 were found not to have complied with the law. The authorities have now determined to test the validity of the law, and as a test is to be made in the case of a prominent hotel keeper, it promises to be one of peculiar interest. The efficiency of the rope as a means of saving life in case of a fire in a big hotel has not been determined; but it seems plain that a rope is a good deal better than nothing. The expense of providing the ropes and the proper fastenings is said to be large; still, it can be only a mere bagatelle compared with the possibility of saving even one life in an emergency.

A NEW SOURCE OF TROUBLE FROM OIL PIPE LINES.—There was considerable excitement in Sussex County, N. J., a few weeks since over the bursting of the pipe line of the Standard Union Oil Company. The oil has spread over

acres of rich farm land in Vernon township, and great damage has been done to growing crops. The soil is saturated and rendered useless by reason of being poisoned by crude oil, some lands being, it is reported, completely ruined, at least temporarily. A great quantity of the oil has flowed into the streams, and fish are dying by hundreds. The fish commissioners are doing all in their power to avert the disaster that threatens the fishing interests. The Neakill river bridge narrowly escaped being destroyed by fire, owing to some malicious person setting fire to the oil one night. The Standard Oil Company, it is said, will be sued by the farmers for the damages sustained by the oil flood.

AN ELEVATOR CUSHION.—Many devices have been tried to prevent serious consequences from the breaking of elevator ropes; but nothing has yet appeared to be in any special degree satisfactory. A properly constructed air cushion would seem to be the thing to be desired. Such a device was projected a few years since in Boston, we believe; but as a serious accident occurred the first time it was tested, the thing was abandoned. It was evidently faulty in construction, for it is not possible for such a device to fail if properly constructed. It would seem from the following, which we clip from an exchange, that success in this direction has been finally accomplished: A successful test of the Ellithorpe air cushion for elevators was made recently in a New York dry-goods house. One of the largest Otis elevators, weighing 2300 pounds, equipped with plate glass mirrors and fragile electric light globes, and loaded with baskets of eggs and with glassware filled with water, was cut loose from the top floor and allowed to fall to the bottom of the shaft. It shot down eighty feet in about two seconds. The "cushion," which stands seventeen and one-half feet high from the bottom of the shaft, and is constructed of wood and glass so as to be air-tight, received the elevator with so little shock that not even an egg was broken nor a drop of water spilled. The test was considered a complete success. The force of the compressed air of the "cushion" gently pushed the elevator up again about four inches, when it descended again to its place without jar. The force of the descent was estimated at the top of the "cushion" as indicating 60,000 pounds.

METALLIC CEMENT FOR STONE.—The restoration of some of the most important stone structures in Paris, such as the colonnade of the Louvre, of the Pont Neuf, and of the Conservatoire des Arts et Metiers, has been mainly accomplished by means of a metallic cement invented by Prof. Brune. It consists of a powder and liquid, the first composed of two parts by weight of oxide of zinc, two of crushed limestone, and one of crushed grit, the whole intimately mixed and ground, other in suitable proportions being added as a coloring matter; the liquid employed consists of a saturated solution of zinc in commercial hydrochloric acid, to which is added, a part by weight, of hydrochlorate of ammonia, equal to one-sixth that of the dissolved zinc, and this liquid is diluted with two-thirds of its bulk of water. One pound of powder is mixed with 2½ pints of liquid.

DON'T USE SHOT FOR WASHING BOTTLES.—Small white globules of porcelain are made in Munich. They are made to take the place of ordinary lead shot used for cleaning wine and medicine bottles, as porcelain is entirely free from the objection of producing lead contamination, which is often the result when ordinary shot is used. Their hardness and rough surface producing, when shaken, greater friction, adapt the porcelain shot well for quickly cleaning dirty and greasy bottles, and as they are not acted upon by acids or alkalis, almost any liquid can be used. If nothing better is at hand, use tacks; but don't use shot.

TO MAKE A GOOD POLISH.—Take one ounce oil vitriol, one half gill sweet oil, one gill powdered rotten stone, 1½ pints rain water; mix and shake well before using; add to the mixture one half ounce nitro-myrrane to make it smell good, stick on a French or German label that nobody can read, boom it in the papers as a newly discovered polish just imported, and you can do a good business. At any rate you'll have a No. 1 polish, and if your customers don't read the papers too closely, you may get rich selling it. Put on with cotton waste and polish with woolen or chamolite.

VARNISH FROM SUGAR.—The Scientific American advises the use of a varnish of sugar. This is made as follows: Dissolve equal parts of white and brown sugar in water to a thin syrup, add alcohol, and apply to hot glass plates. The film dries very readily, and furnishes a surface on which it is perfectly easy to write with pen or pencil. The best ink to use is India ink, with sugar added. The drawing can be made permanent by varnishing with a lac or mastic varnish.

TO MAKE A FLANGE JOINT that won't leak or burn out on steam pipes, mix two parts white lead to one part red lead to a stiff putty; spread on the flange evenly, and out a liner of gauze wire—like mosquito net wire—and lay on the putty, of course cutting out the proper holes; then bring the flanges "fairly," put in the bolts and turn the nuts on evenly. For a permanent joint this is a 1.

The Elko Mica Mine.

The Salt Lake Tribune says: "The wonders of this western country are just beginning to be opened up. The latest report of discoveries comes from Elko county, Nevada, where what is claimed to be the most valuable mica mine in the world has just been purchased by G. D. Schell of this city, for himself and John J. Buckout of St. Paul, Minn., at the moderate price of \$60,000. The mine, however, is not a new find; it has been located, and assessment work has been done for several years, but it has remained for Mr. Schell, an experienced miner, to catch on to the mine's true value, and now the property could not be bought for \$100,000. The mine is up in the Ruby mountains, 10,000 feet above the sea level, and it is 4000 feet up from Ruby Valley to the mine.

Mr. Schell went over there last week to examine it, and now he is in possession of mica deposits superior even to those of North Carolina. Mica is found in Wyoming, New Mexico and Hampden county, Massachusetts; but the upheavals seem to have shattered the plates, and contact with iron had discolored them, so that the demand for good stock has far exceeded the supply. The Ruby range vein is 12 feet thick and crops out here and there on the surface for 1000 feet. Shafts have been sunk which show that the further down you go the faster the mica improves. At a depth of 50 feet plates two feet square prevail just as clear when held up in the light as the average window glass. The plates are firm, and free from the crackle characteristic of surface mica, so that at a depth of 75 or 100 feet stock might be found as free from defect as crown plate. Work has begun under Mr. Schell's superintendency. One ton daily will be extracted from the mine and shipping in 100-pound boxes will begin as soon as possible. The two feet square plates of mica are not of a commercial size, as the largest used in store windows are 4x6 inches; so they are cut up into assorted sizes to fill orders. The 2½x2½ inch plates are worth 70 cents per pound, wholesale; the 4x4 inch size, \$9 per pound, and the 4x6's \$12; so that prices per ton range from \$1400 to \$24,000! Mr. Schell will put a full line of his mica mine stock in the Deseret Agricultural Fair, and hopes similar veins may be found in Utah. He has brought back to the Continental hotel a full line of samples from the mine, and is showing them to his friends with justified pride."

A Lucky Miner.

The lease under which Dart, Oliver and Johnson worked the Bonanza mine the past two years expires in a few days. When they cleaned up the last pocket a few days ago, without assuming more expense for the short time left for the lease, they notified J. G. Divoll that the mine was at his disposal. Mr. Divoll came to Sonora, Wednesday, and proposes to work it himself, having unbounded faith in its great richness. Wonderful luck, if it is luck, has attended Divoll in all his mining operations. Coming here in 1862, he was engaged at different times in various pursuits, which he often left to try his fortune in mining, which always proved profitable to him. Working pockets in different mines on Saratoga Hill, at short periods he made strikes that always kept him supplied with money. A few years ago he acquired an interest in the Bonanza mine. It was worked several months without result. Not until Divoll's direction was followed did the mine yield, and then it gave up several hundred thousand dollars, making each owner rich. After the big yield the entire mine came into Divoll's possession, and a few days after he pointed out where more gold was situated, and \$60,000 more were added to his pile. Thinking he had a bank to draw upon at will, with plenty of money for his uses, he left the property idle for a time. Two years ago he leased it to Dart and Oliver. They worked for a while, but not until Divoll pointed out where the pockets would be found did they meet success. During the terms of the lease nearly, if not quite, \$150,000 was taken out. Now that Divoll himself intends working the mine, there will be no surprise here to learn that another fabulous amount has been added to the circulating medium of the country. Every time he gets to mining it seems that what he touches turns to gold, and those who were connected with him have enjoyed the benefit of his luck. Whether he be a good miner or not he has thus far been successful, and that is the best test to be had. He seems to have an intuitive knowledge of the way lodes and leads run, and can tell by a fissure or seam what will be found by following it. He is confident that larger sums remain than has yet been extracted. With his knowledge and luck there will be no surprise at any amount of gold he may yet take out of the Bonanza.—Tuolumne Democrat.

MARY J. SHIELDS, Martha J. Trebilcock and John H. Paul have brought suit in the Supreme Court against the Empire Mining Co. of Grass Valley for damages aggregating \$87,000. At the explosion at the Empire mine a few months since Paul was badly injured, Mr. Shields' husband was killed and Mrs. Trebilcock's son lost his life. The complainants allege criminal carelessness.

The Chollar mine yielded \$24,551 last month; average value of ore, \$21.73.



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SAN FRANCISCO

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TABLE OF CONTENTS.

EDITORIALS.—Growth of the Mining Industry; Portable Smelting Furnace; Number of Paying Quartz Mines; The Key Monument; 1. Passing Events; Low Price of Silver and Its Effects; Two Shafts; Mining in Bolivia; B. Going for the Secondary Deposits; Chute Landing; The Cipher in the Shakespeare Plays; Badness Depressions; 9. Russia in Asia; British Investment in America; Improvements in Warfare; 10.

ILLUSTRATIONS.—Portable Smelting Furnace with Williams' Improvement; 1. Vessels at a Chute Landing on the California Coast; 9.

CORRESPONDENCE.—Kernville Notes; Los Burros Mines; 2.

MISCELLANEOUS.—The Astronomer's Dream; Laziness and Luck; 2. The Close Fists Company; Cost of Mining; The Prospector; A Historic California Town; 3. The E'ko Mica Mine; A Lucky Miner; 7. Industrial Notes; 13.

MECHANICAL PROGRESS.—Progress of American Iron Industries; Manganese Steel vs. Iron; Drawing Canal Boats with a Locomotive; Russia; Iron; Superheating Steam; Bull's Metal; Fine Wire Drawing; Propeller Blades; 3.

SCIENTIFIC PROGRESS.—The Action of Water Upon Lead Pipes; Man in His Relation to Coal; Dust Particles in the Air; Utilizing Sun Heat; Electrical Progress in 1887; Conversion of Heat into Electricity; A Remarkable Telephone; Where Phosphorus and Manganese are in Basic Pig Iron; Edison and Flying Machines; The Curves of Fish; The Earth Crust under the Sea; 6.

GOOD HEALTH.—State Board of Health; Prevention of Scarlet Fever; Crematories; 7.

USEFUL INFORMATION.—A Valuable Plant; Life-Saving Ropes; A New Source of Trouble from Oil Pipe Lines; An Elevator Cusping; Metallic Cement for Stone; Don't Use Shot for Washing Bottles; To Make a Good Polish; Varnish from Sugar; 7.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming; 4-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments; 12.

SHOP NOTES.—Forty Years Ago; Orderly Shops and Good Tools; Do Tools Grow Tired; Pulley and Belt; 11.

STEAM BOILER NOTES.—Often Your Hard Water; Exhausting Back into the Boiler; Copper vs. Iron or Steel Pipes; The Test Pressures of Marine Steel Boilers; Steam vs. Water Power; The Corliss vs. Slide Valves; To Prevent Foaming; To Avoid Tearing the Manhole Gasket; Repairing Steam Pipe Breaks; Castor Oil in Boilers; 11.

COTTON AND WOOL.—Evolution of Cotton Seed; Reclamation of Waste Products in Wool Scouring; Cotton Cultivation in Russia; Our American Angoras; The Quality of Cotton; Cotton Mill Building; Sheep Shearing; Evolution; 12.

FLOUR MILL NOTES.—A Flour Mill Run by Electricity; British and American Wheat Growing; Flour Millers' Convention; 12.

Passing Events.

The observance of the National holiday has, as usual, caused a cessation of business during the week. In addition to the usual festivities of the day in this city, the monument to Francis Scott Key, author of the "Star Spangled Banner," was unveiled in Golden Gate Park.

The Idaho gold mine, Grass Valley, Nevada county, this State, paid its 225th consecutive dividend this week. The ore now coming out of this famous mine is about as rich as any they have had. Few mines can show such a record as this.

The strikes among the iron-workers in prominent Eastern foundries have assumed large proportions. Most mill-men believe the suspension will not continue longer than two or three weeks. A shut-down is always necessary at this time of the year for repair and stock-taking. The manufacturers, they claim, have used the same arrangements for years, and always opposed the Amalgamated Association as vigorously as at present. Since the strike of

1882 the scale has been signed in conference with but one exception, and that was in 1885, when a strike was declared. One by one the firms signed the scale that year, and the strike was over and the mills were all in operation within a month. On the other hand, the manufacturers assert that their mills are in good repair and that they could run all summer, but they will not pay more than \$5 per ton for puddling.

Low Price of Silver and Its Effects.

Silver has not long since been selling at 87 cents per ounce, the lowest figure touched during the century. Recently the price has somewhat improved, but even the present condition of the market is having a very depressing effect on the production of that metal, and unless an early advance in the price occurs, both the and many other industries are bound to suffer severely. That such advance will take place there is good reason to believe.

Now that one of the leading political parties of the country has declared in favor of both gold and silver as money and against the efforts being made to demonetize the latter, the chances of procuring legislation more friendly to the white metal seem somewhat improved.

It is pretty well understood that Senator Stewart has not abandoned his plan for having silver bullion deposited in the mint and certificates issued therefore to circulate as money. The Senator yielded his preference for his own and supported the Beck bill on the ground that the latter seemed at the time to have the better chance of becoming a law. Since its failure the Senator from Nevada has evinced a purpose to reintroduce and urge the passage of his original bill, slightly altered perhaps in some of its features. Should he do so, there is a strong probability that his effort will be crowned with success, as his own party might be expected to lend it their support.

That this measure or even the unrestricted coinage of silver should meet with so much opposition in this silver-producing country is something strange, seeing none of the evils predicted as likely to attend the increased coinage of this metal have here been experienced, nor has any inconvenience attended a like policy in other countries where its coinage, compared with its currency value, contains much less metal than our silver dollar. Among the nations of Europe the coinage rate varies from 14.9 to 15.5, the average being 15 ounces of silver to one of gold, whereas our standard silver dollar is 16 to 1.

Why such a persistent warfare should be kept up on this coin or on a more general use of silver in a country where this metal forms a staple is something inexplicable. The impression that obtains in certain quarters that silver is being produced at a dangerously rapid rate, or that it is so accumulating in the U. S. treasury that it is with difficulty the Government can get rid of it in payment of its creditors, is wholly without warrant. The world's annual product of this metal amounts at present to only about \$108,000,000. Of this the United States produce \$53,000,000, Mexico \$26,000,000, South America \$15,000,000, and all other countries \$14,000,000. When it is considered how much of this total is absorbed in the arts and otherwise disposed of, the coinage of the remainder instead of causing a glut can hardly meet the growing wants of this actively commercial age. As regards the accumulation of silver in the National treasury, there is reported to have occurred there during the year ending October 31st a decrease of more than \$20,000,000, and that the department has for the past few months paid out more silver than has meantime been coined. For some time past, in fact, it is gold that has been increasing in the treasury while the amount of silver has declined.

It is time this warfare on the white metal should cease, as its cheapness is beginning to tell with fatal effect on that branch of mining. Only under especially favorable conditions can it be made to pay any longer. Some companies engaged in this business have in consequence suspended operations and others are threatening to do so. Unless the market for this metal meets with early improvement, wide-spread disaster is to be apprehended. Nor is it the miners alone who suffer from this cause; all the debtor and producing classes are more or less affected by it. What makes the situation the more intolerable is the fact that it is largely due to extrinsic and

gratuitous causes. But for the efforts made to disparage silver in the interest of the creditor classes it would have been worth 20 per cent more than it is to-day.

There has been no over-production of this metal. On the contrary, it has not kept pace with the industrial and commercial expansion of the times, nor has it been relatively very much greater than that of gold. During the past 10 or 12 years the coinage of the various mints of the world has been larger than the product of silver made meantime, disclosing the general popularity of this metal and the impolicy of seeking to restrict its free coinage in this country.

Two Shafts.

As soon as a mine has commenced to attain any advanced depth, and give employment to a number of miners, facilities should be provided by which the men underground could escape in case of fire in the main shaft. The recent fire in the mine near Ophir, Placer county, offers a case in point. There, when the works at the shaft got on fire, three men below were asphyxiated. There was no way for them to escape. The men above were powerless until the fire was out.

In some countries there are laws compelling the companies to have two shafts, but if we had such a law here it is not probable it could be enforced. In some instances it would work a hardship as entailing additional expense to poor owners, and owners of rich mines would not spend the money in that way unless it was necessary for the proper working of the mine. With the mere object of providing safety for the men alone, few such shafts would be sunk unless it was compulsory.

There are many mines where the men literally take their lives in their hands when they leave the surface. A fire at the hoisting works would be fatal to them below. If men would refuse to work in such places a remedy would be found. The difficulty is to get concert of action among miners generally. At all events it would be possible to have some arrangement for furnishing air below, which could not be destroyed or put out of order in case of a fire at the mouth of the shaft. Mines having no more than one means of escape are never perfectly safe.

ACADEMY OF SCIENCES.—At the meeting of the Academy of Sciences on Monday evening the following donations to the museum were received: A collection of shells and echinoderms by Mrs. Van Gorden of San Simeon; fossil shells by C. W. Know of Parisima Creek; an obsidian arrow-head, found in Golden Gate Park by D. P. Secor, a visitor from Connecticut. The present to the Academy of a full set of Trouvelot astronomical drawings, valued at \$100, by a member of the Academy, who did not wish to be known, was announced by the librarian, who also reported the receipt of 48 books from correspondents and 13 books by donation. Dr. H. H. Behr read an interesting paper on the sudden appearances and disappearance of the *Vanessa Californica*, a beautiful butterfly that appears in myriads at times in California, and then is not seen again for perhaps 15 years.

LEACHING.—We shall commence next week the publication of a series of articles describing the Russell process of treating ores. The articles will be illustrated and will be of interest to the mining community, as all details will be given.

St. Louis realizes about \$400,000 a month from the investments of citizens in gold and silver mines. The St. Louis people are investing largely in mining property.

THE U. S. Treasury now contains the sum of \$629,854,087. Of the public debt, \$14,429,503 was paid off in June. The total public debt is now \$1,717,784,791.

THERE is a hitch in the building of the Cuyamaca railroad, and the projectors are stopping to raise \$70,000 before they proceed.

THE reduction of duty on pig iron proposed by the Mills bill is from the present rate of \$6.72 to \$6 per ton.

THE stage from Hildreth to Maderia was robbed on Monday and hullion valued at \$10,000 was stolen.

Mining in Bolivia.

[Written for the Press by Santiago Black, of Oruro, Bolivia.]

Having taken much pleasure in the perusal of your valuable and justly popular paper, and thinking that some of your readers might take an interest in mining matters from a region of which I believe that there is as little known as of any civilized country existing, I therefore send you the following remarks on the mining advantages and disadvantages of Bolivia.

Of the mineral wealth of Bolivia, it may truthfully be said, the "half was never told." And of the antiquity of all methods now in use for treating that mineral, and of the almost complete ignorance of all the most modern methods of, and machinery for treating ore cheaply or economically, it may with equal truth be said that the half would never be believed, even if it were told.

A densely ignorant people, instructed by those who were scarcely more enlightened than themselves, they have ever been and still are in the condition of the blind being led by the blind. And the only reason they do not all fall into the ditch, may be found in the fact that they are already at the very bottom. And as the laws of gravitation are not conducive to falling up hill, they will probably remain in their present condition until the advancing wave of progress shall move them aside, or the light of a better education dispels the darkness in which they were born, and in which they have been contented to live.

Some of the mining advantages are as follows: First: That there are large quantities of discarded ore on the dumps of different mines, which, with proper appliances, would give a good profit for working. That there are not only mines, but groups of mines unworked, which, with proper machinery and a thorough knowledge of mining and milling, might be made to pay most handsomely. Free gold exists in certain localities, in more or less large quantities, but in all parts which I have visited, it requires a considerable outlay of capital to accomplish anything worth speaking of.

This is a country almost destitute of fuel, but water-power can be obtained in abundance, which does away with the absolute necessity of running the machinery by steam.

Special opportunities are offered in the working of tin. That metal, which is steadily increasing in value, and for which the world is constantly finding new uses, abounds in certain districts of this country.

An enterprise which could scarcely fail to pay well here would be an ore crusher, with good concentrators, either treating ore for so much per ton or buying the ore and treating on one's own account. When one considers that the tin mines, worked in a very unsystematic manner, and the ore washed in the most primitive way have formerly paid dividends, and also that the bulk of the ore is still untouched in those mines, it will be seen how well the above-mentioned enterprises would pay.

There is a dearth of practical men in Bolivia. Most of the foreigners who visit Bolivia, if not of a dissolute sort, are at least of a sort who have no peculiar choice of the manner in which they shuffle through this life so long as it costs them no great exertion, and who, after a life of debauchery, are apt to blame the country for the misfortunes they have brought upon themselves.

Bolivia was first mined for gold and silver by the Indians, who also put a price on the precious metals, though for what reason cannot at the present day be satisfactorily explained. And when the Indians were reduced by the Spaniards to almost abject slavery, they were not only compelled to labor for a mere pittance, but were forced to impart to the harsh lashmasters all the knowledge they had of the country. So that I believe there is not one square mile of Bolivian country accessible to the white man which was not thoroughly prospected long before the present generation came into existence. Consequently, to the poor prospector Bolivia offers few inducements; and to the working man (unless he be a good mechanic), it offers much less. But for the man having sufficient capital to work upon and bringing the necessary machinery there awaits a fortune both certain and large.

The Idaho mine at Grass Valley on Monday declared its 225th dividend. The ore now coming out is very rich.

Going for the Secondary Deposits.

In a late number of the PRESS something was said about that class of our auriferous gravel formations known as tailing deposits, two of which, the one resting in the bed of Slate creek and the other in Shirt Tail canyon, being there spoken of as constituting the most important of these secondary deposits. We have, since the publication of that article, been informed that active measures are in progress for opening the last named deposit, which it is calculated will be in operation within the next few months.

The quantity of stuff to be handled here is enormous, amounting to something like 10,000,000 cubic yards, all of which is more or less auriferous. How much gold it carries cannot well be determined, though the experts count, we believe, on \$1 per cubic yard, at least. In prospecting the bedrock as much as a dollar to the pan is sometimes obtained, the most of the gold here being coarse. That distributed through the great mass of the material is, however, rather fine, being such as in former washings escaped from the hydraulic sluices. With the improved gold-saving apparatus now in use, even the smallest particles of the precious metal contained in these tailings can be arrested and saved, nor will the cost of rehandling them be very large. This will, in fact, be the simplest and least expensive kind of mining extant, neither complicated machinery, science nor costly methods being required for carrying it out.

At the start an open cut of sufficient dimensions will have to be blasted through the rocky ledge that crosses the channel below the deposits and prevents their being carried out by the winter floods. This done, and the bottom of the cut paved with wooden blocks or bowlders, it will only remain to get the material into the outletting race, a service that is to be performed by a machine recently invented for moving this class of deposits, aided by the water that runs down the canyon.

The above will be the only preliminary work required to be done, as also the style of plant and the mode of procedure here called for. Simple and cheap enough considering the big results that may here reasonably be expected.

UTILIZING FURNACE SLAG.—In one of the addresses delivered at the meeting of the British Association, held at Aberdeen some two years ago, it was remarked that the iron smelters had not been particularly active in their efforts to discover methods of utilizing the blast furnace slag. There would be no room now for any complaint on that score. The attention of the iron and steel trades are largely concentrated on this point, and much progress has been made of late. The Skinningrove Iron Company, at Loftus, are putting down a crushing plant to reduce the slag for cement. In most of the attempts yet made to utilize cement, the outlets considered likely have been for cement, road-making and paving flag-stones. More attention is being given to this matter in England than in this country. It should not be so. The utilization of waste materials in every department of industry should claim the earnest attention of all persons engaged in industrial employments. We expect to see in the near future a much wider and more far-reaching development in this direction than has heretofore prevailed both in our own country and abroad.

KRUPP AND THE JAPANESE GOVERNMENT.—According to news from Berlin, Krupp has lately made an arrangement with the Japanese Government to establish a branch of his cannon-making business in Japan, and is to manufacture all the heavy artillery the Government may require.

Chute Landings.

The immense lumber trade of the California coast is carried on as far as shipping facilities are concerned under disadvantages which few realize. There are very few good harbors anywhere on the coast line, and from those places where the lumber is shipped, there may be said to be none at all. The result is that a system has been devised for placing the lumber on the vessels, which is different from that in vogue anywhere else in the world.

Wherever there are lumber mills in small settlements, a "chute landing" is built, and at these chutes all the freight by sea is handled. As there is as yet no railroad running anywhere near the coast in Sonoma, Mendocino and Humboldt counties, about all the lumber and freight traffic is done by schooners, and for them the chute landings are necessary.

As a general thing these chutes are built on the south side of the points, so as to be protected from the prevailing northwest winds of the summer months. Many of them are very expensive structures to build and maintain. At some places it is expected that the chutes will be carried away by the storms of winter, so that new ones are built each season. There are other places, however, where the chutes have

with chutes, since wharves cannot be maintained.

The Cipher in the Shakespeare Plays.

Through the courtesy of Mr. Moss, we have been allowed free access to the original folios of 1623 and 1632; these folios are in the well known library of Mr. Adolph Satro. The historical plays in the folios 1632 have every bracket and hyphen faithfully preserved. The pages of Henry V are slightly different—two pages are incorrect, 94 is 49, and 95 is 59. We have not space to give the remarkable results arrived at since writing our review of Mr. Donnelly's book. As, however, much favorable comment has been passed upon it, we give the following for the benefit of such of our readers as may feel interested.

The number 836 is obtained by multiplying 76 by 11; (the number of bracket words on column 1, p. 74). On subtracting 284, the number of words on column 1, page 74, from 836 we obtained 552. This number is greater than 523 by 29 (the modifier at end of column 2, page 74); one of Mr. Donnelly's root numbers derived from the primary root number is 523.

On taking 29 from 836, that is, on "modify-

Business Depressions.

More often than otherwise business depressions are merely the result of our imaginations; just as people often imagine themselves sick, when, in truth, they have no ailment at all. It is quite common to hear the expression—"Trade is dull," with perhaps the addition, "much more so than a year ago at this time." When any considerable number of people are impressed with such an idea, and are constantly giving voice to it, it will be so. Business will be dull because those who unconsciously work to that end make it so.

The disposition of the American people is to activity, to quick trading, to rapid progress in the developments of trade and industry. They would like a continuous boom. They are never satisfied with steady, legitimate trade. Money must be made rapidly; fortunes must be accumulated quickly. Some are thus in a hurry to the end that a period of rest and repose may be secured; but perhaps the majority continue the active pursuits of business for the mere love of excitement which it brings. The latter is more apt to be the case with the very wealthy—with the many millionaires. Our heavy millionaires do not continue in business merely for the love of money, or for what it

will bring them so much as for the pleasure and excitement of getting it.

But to return; if people instead of saying "trade is dull" should on all sides agree in the remark that business is good, as good or better than it was a year ago, so it will be. Of course there are some times causes for genuine depressions in business; but as a general thing, such depressions are greatly intensified by the unconscious acts of the masses who are constantly complaining and imagining conditions which do not exist, just as many make themselves sick through the imagination. There is probably no part of the world where these things are more observable and real than in California.

If a man is out of business and has a little spare cash, the question

is generally "What shall I do?" In this state he is quite too often down to the stock exchange, or allured by speculation of corner lot speculations. Don't do either. If you have a little money and don't see just how you can get into any better business, get yourself a small piece of land that you know you can handle, set out fruit trees, sow a small patch of alfalfa to feed a cow or horses or both, if you can make a profitable use of them. Plant a few vegetables for yourself and family. Raise a few chickens as broilers and for eggs. You can always sell the surplus over and above your own wants. In the meantime, while your fruit trees are growing, improve as best you can the ground between them. It will neither impoverish the trees nor prevent their growing. By such a course you will soon place yourself beyond want, and you will be able to add from time to time to your possessions, until you are quite independent. Of people who will do this the country will never have enough.

If all our people who are out of business would pursue this or some similar course of life and cease repining over the lack and dullness of work, we should have fewer "depressions of business," less poverty and want, and a universal and continuous reign of prosperity and happiness.

INDUSTRIES GROW Apace.—In 1878 twenty tons of basic steel were made in England. The yearly production now is nearly 5,000,000 tons. Other countries have within recent years, and contrary to former experience, increased their production of iron and steel in a far greater ratio than Great Britain, which was formerly the chief factor in the world's supply.



VESSELS AT A CHUTE LANDING ON THE CALIFORNIA COAST.

stood for years. At most of the landings there is only one chute, but in several instances there are two or three, where the trade warrants it. The illustration on this page shows the chutes at Coffey's Cove, in Mendocino county, and the little coast steamer Yaquina loading at one chute, and a lumber schooner at the other.

From the cut the general appearance of the chute is shown, and some idea of its construction is also given. The shears or legs are firmly secured to rocks, and the apparently frail structure is secured to them, held in position and braced by strong iron cables. The old cables of the cable railways are now utilized for chute building. The lumber is slid down the chute to the vessel, and by means of a brake at the extreme end its speed is checked before it goes to the deck. In lowering freight and baggage to steamers a sled is used, and horses draw this sled up with whatever is to come ashore from the steamer.

The outer end of the chute is so arranged that it may be raised or lowered to suit the tide or height of vessel. Many of these chutes are very long and quite expensive. Certain specified charges are made, these rates being fixed by law. The large mills of course have their own private chutes. The vessels are securely moored, so as to remain as nearly in one position as possible, but many are lost every year owing to the poor harbor facilities. Nearly all these chute landings are exposed in the winter months when the southwest or southeast gales blow. Nearly the entire lumber trade of the northern coast is carried on by vessels which load at these chute landings. Of course, at such places as Humboldt bay there are wharves, but the majority of the landing places are fitted

ing" 836 by 29, we obtained 807, and now by counting in the brackets and hyphens on column 1, page 74 in addition to the 284 words on the same column, we obtained 284 + 18 h & h; + 10 b; + 7 a; + 18 - bracket h = 302, 294, 291, 301. On taking these numbers from 807 we obtained 505, 513, 516, 506 (and 523).

These are Mr. Donnelly's root numbers, and the primary root number is, therefore, 836.

W. G. H.

LOST BONDS AND NOTES.—The lost bonds of this city amounting to several thousand dollars, about which so much has been said within a few days, calls to mind the fact that something like \$59,000,000 of the paper money issued by the United States has been lost or destroyed, by which the government is so much the gainer. During the last fiscal year the government coined \$33,266,831 silver dollars from \$24,563,615 worth of silver bullion. Here also is a large gain. It is well known that a large proportion of the profits of banks which issue paper money is derived from bills which are lost or destroyed, and, of course, never presented for redemption.

MINT COINAGE.—During the month of June \$1,882,000 was coined in the mint in this city, as follows: Gold—Double eagles, \$1,195,000; eagles, \$370,000. Silver—Standard dollars, \$239,000; quarter dollars, \$78,000. The total coinage at this mint for the fiscal year ending June 30th was \$25,701,284.80, divided as follows: Gold—Double eagles, \$12,555,000; eagles, \$7,260,000; half-eagles, \$2,995,000. Silver—Standard dollars, \$2,304,000; quarter dollars, \$192,000; dime, \$395,284.80.

Russia in Asia.

The Greatest Undertaking of the Century.

Very few people realize the large amount of work and engineering skill involved in the immense system of railroads which Russia is pushing forward into Northern and Central Asia, or the vast influence, political and commercial, which it is destined to exert on Eastern and Central Asia, the most densely populated section of the globe, and the source from which originally emanated the germ of almost every thing in religion, science, production and population, which the world now enjoys.

The completion and opening of the first or Samarqand section of the great trans Caspian road has just been announced. This section of the road is about 1000 miles in length and has been constructed in the short time of three years at the comparatively small cost of a little over \$31,000,000.

This is the pioneer of the great system of roads which Russia has laid out for Asia, work upon which has been commenced at several points. This system of railroads is the most stupendous one which has ever been entered upon in any quarter of the world, and greatly dwarfs our own transcontinental system.

The main feature of the system, which is already well under way, contemplates first a road from the northern part of the Caspian sea, following close along the southern border of Russia in Asia to some point near the mouth of the Amoor river, which empties into the Okhotsk sea, about midway of the gulf; or it may be continued southerly down to the southern extremity of the province of Amoor, to about the central portion of the west shore of the Sea of Japan. The entire distance will considerably exceed 5000 miles. Most likely there will be another road—an extreme northern branch—leaving the main road at some point before it reaches the province of Amoor, running north of the Okhotsk sea and reaching the Pacific Ocean at the most available point at or south of Behring's straits.

We have next the trans-Caspian system, which starts from the southeastern shore of the Caspian sea, and runs in an easterly direction just north of and parallel to the northern boundary of Persia. This road has already been completed through Merv to Samarkand, a distance of 1000 miles. It will be continued still further in a northeasterly direction to Tashkend.

At this point it will rest for the present, and be within easy distance—100 miles—of the western frontier of the Chinese Empire. From this point it will be carried still farther east and connected with the system of roads which must eventually be opened up in China.

Commercially speaking, this will be the most important of the entire system, as it follows very nearly an ancient highway of trade, and passes through several large cities which have been for ages the center of the great caravan trade of Central Asia. The country which it traverses is very level and highly productive—the most, probably, of any portion of the earth. Notwithstanding its commercial importance, it has been thus far constructed as a military road. Its object in that direction has been to consolidate and secure Russian control in Central Asia, and to prepare the way, when the proper time comes, for ready entrance into China or British India. It will eventually become the great central highway from Northern Europe to Peking.

Still another road has also been initiated by the Russian Government, exclusively within the bounds of Persia, starting from the southwest corner of the Caspian sea, and running eastwardly direct to Teheran, the most important city in the north of Persia. From that city the road will fork, one branch running eastward and northward to connect with the road already described at or near Merv. Another branch will leave Teheran and run south to some point on the Persian Gulf. This road is being constructed under the authority of the Persian Government, but by a Belgian syndicate, enjoying the warm support of the Russian Government. Material for the road is already arriving from Europe.

By a careful study of the map of Asia in connection with these lines, it will be observed that Russia is sending out two immense iron arms upon the north and south by which she will soon have Central Asia completely within a firm grasp.

It is only about two years since the world

was wildly excited over the prospect of a war between England and Russia on account of Russian military advances into the neighborhood of Herat, which city it was thought the Russians intended to make the base of active operations against British India.

It is now well known that the alarm was at least premature. Russia has made no further direct approach, but her generals have quite effectually flanked it, and the matter of possession is assured whenever circumstances may demand it. So far as actual evidence goes, the operations of Russia in Central Asia are purely commercial and absolutely peaceful. No one can say that she has any other object in view than the opening of markets in Western China, Central Asia and in Persia and Siberia. This is just what the English are doing on the south. The commercial possibilities in this direction are immense for Russia and for the world at large. Russia has complete command of the Caspian sea, with the magnificent navigable waters of the Volga penetrating for a thousand miles to the very center of that vast country. Her Siberian road will cross a large number of magnificent rivers, which are already alive with steamers which can bring the products of all Northern Siberia direct to the rail. Most of the country through which these roads pass are level and extremely fertile and more or less filled with minerals, especially iron and coal. The roads can be built with the cheapest labor on earth, and the right of way will cost but little or nothing.

Could the jealousies of the English and Russian Governments be adjusted, all these roads could be completed in a very short time and an immense commercial business built up which would greatly enrich the world and in no way injure British commerce. Such a thing, however, can hardly be looked for during the present century, although the work of road-building will go on continuously but with comparative slowness. Russia will use every possible effort to convert her Asiatic railroads into the actual development of Central Asiatic resources, but at the same time she will be always prepared to use them for military purposes whenever occasion may require. The possession of these roads, when completed, will be worth millions of men at arms and whole fleets of ships in any conflict which may be precipitated in Central Asia.

In the meantime England will exert her every muscle to paralyze the execution of the project and keep Russia confined within her hyphorean bounds. But the effort will be futile. The march of progress cannot and should not be arrested. Who can tell the inestimable blessings which would be conferred upon Central Asia if peace and good-fellowship could be set up between these two great powers, and Russia and England joined by a mutual connection of the trans-Caspian and Anglo-Indian lines of railroad and commerce?

THE STUDIOUS MECHANIC.—No mechanic ever excels or becomes prominent in his line of industry without much thought and study. It is not enough that he should get through his day's work and do it well; he must spend his leisure evenings and days when he has them, in improving his mind, in acquiring general information, as well as a knowledge of his own particular calling. A contemporary truly says: "The man who by thought and reading makes himself fit to be a foreman will some day find himself in a foreman's position; but the man who never reads and never thinks, who spends his out-of-shop hours in a groggery, will never be able to take a leading position. Edison or Westinghouse arousing in the beer shop would be Edison and Westinghouse unknown to the end of the chapter."

THERE are 140,000 miners engaged in the anthracite and bituminous coal mines in Pennsylvania. The Bureau of Labor report shows that the average daily wages is \$2, and there were 158 idle or lost days. In the bituminous regions the theoretical wages are \$16.20 a week, but when the lost days are subtracted, the average is only \$7.10. The average miner's wages, by the report of 1886, is \$6.67 a week.

MECHANICS TOOLS WANTED IN MEXICO.—Vice-Consul Charles Winslow, at Guerrero, Mexico, says carpenter's, blacksmith's and shoemaker's tools are in great demand, and sell rapidly and at good prices in that State. Tools of American manufacture have a decided preference.

British Investments in America.

The frequent announcements in English and American journals of British companies organized for carrying on the various industries in this country has become a topic of much thought and speculation. There are two classes of organizations of this character—the one merely furnishes the capital and transfers all the profits thereof to England; the other is a bonafide investment of both capital and profits in this country. The first is a leach upon our people, and should not be encouraged. True, it furnishes employment for labor and adds somewhat to our population, but the business is generally of that character which employs the largest amount of capital and the least amount of labor.

The most noted of this class of investments, and the one most pernicious to our interests, is that of cattle-raising. A firm in Scotland has furnished statistics which show that the British capital invested in cattle companies in this country exceeds \$20,000,000. The statistics referred to enumerate eleven companies who own in the aggregate nearly 700,000 head of cattle and occupy 3,319,000 acres of land. The first organized of these companies, which was started in Edinburgh, declared dividends for the first few years of about 20 per cent on its investment. This success quickly led to the organization of ten other companies, which are enumerated. The heavy profits that were realized at first led to such close competition that little or nothing has been made by these companies during the two years last passed. The London *Financial News* speaks of the present condition of these companies as follows:

The English investors in American ranch companies, who are at present quarreling with their directors or their managers in this country [England], and are attributing their diminished dividends to mismanagement, will do well to study the report of the International Range Association. This organization was the outcome of the convention of cattle owners recently held in Denver. It declares that such a producers' combination as this is ominous of trouble ahead, even for a "ring" so immensely powerful as that which owes its existence to the so-called "butcher kings" of Chicago. All roads lead to Rome, and it is becoming exceedingly difficult for the Western producer, whether of cattle or corn, to clear his produce for the Eastern seaboard without leaving his entire profit in the hands of one section or another of the Chicago middlemen. It is notorious that these gentlemen have obtained such freight concessions from the trunk line railroads between Chicago and all Eastern points that they have secured the complete monopoly of the Western meat trade. In addition to this, the Western farmers and ranchmen in these depressed times have become largely indebted to Western banks, and these banks are in turn controlled by the great wealth of the Chicago kings. But the countermeasures thrown out by the Convention at Denver, which promises to combine and control all the local stock associations from the Gulf of Mexico to Puget Sound, may well commend the consideration of this, the greatest ring America has ever known.

So it appears that the railroads are getting the chief portion of the profits of the British cattle companies. It also appears that these foreign investments have served the useful purpose of lessening the price of beef in this country, and such being the case no one here is disposed to find much fault. At the same time the occupancy of such an enormous area of lands by these capitalists is a constant source of irritation and adverse criticism on the part of our people; but if they don't make any more money for the next year than they did last, they may be willing to sell out cheap, for there is such a thing in this country as a man or a company becoming "land poor."

The kind of capital which is most beneficial to our people, however, is that which is seeking investment in the manufacturing and producing interests in the Eastern and Southern States. A large number of plants in the silk, wool, cotton, and iron business have recently been either removed to this country from England, or established here as new enterprises. As a general thing the owners of these enterprises accompany them and bring large numbers of their own workmen to run them. Such investments add to the permanent and material wealth and population of the country, and should be, in every proper way encouraged. Uncle Sam can, and is ready to take them all in and do for them as he would for his own native-born children.

We notice among recent movements in this direction one in the *Iron and Steel Trades Journal* for May 19th, that the preliminaries

have been settled and a company formed for producing metals from the rich mineral resources at Talladega, Alabama, under the auspices of Mr. G. W. Chambers. About six months ago, Mr. Joshua Lancaster, managing partner of the Mostyn & Darwen Iron Company, paid a visit and made a careful inspection of the mineral lands in Alabama, and the result of the visit is highly favorable. A company has been formed with a capital of £100,000, and it is proposed to erect a blast furnace for smelting the rich minerals of that district which abound with valuable deposits on the property of Mr. Chambers. The minerals comprise manganese, specular ore, and brown hematite, and the company will undertake the making of chrome iron, manganese, spiegel and hematite metals.

Improvements in Warfare.

One of the most interesting features of modern progress is the influence or modes of warfare exercised by scientific and mechanical discoveries. The entire practice and paraphernalia of warfare has been revolutionized within the past 30 years. The armored ship, the heavy guns made possible by modern improvements in manipulating iron, the use of machine guns for service as small arms, improvements in explosive material, the much greater efficiency of shells due to improved explosives and especially the very latest improvements in employing these new explosives, by the use of pneumatic guns, etc., are all marvels of progress in the way of destruction.

The bicycle will be made to supersede the horse under certain circumstances in the next great German war, and dogs are also being trained by the French to harass and worry the enemy. As a finality of all these improvements, we now hear of

An Electric Sword.

This letter is certainly a shocking if not a most efficient and deadly weapon, which strangely enough comes to us from China, where all things seem to have had their beginning. A soldier in using this weapon has an electric battery concealed in his waist, with insulated wires running to the sword. When the point of the weapon touches an adversary, the latter is paralyzed, and the wielder of the sword can be said to have made an electric charge. There is much that is curious and possible in connection with this latest invention of our celestial neighbor. The victims are not hewn down in a slow and bloody death. They perish quickly. Of course, such scientific execution would take away much that is poetical about a battle field. "Rivers of blood" would no longer flow nor "gory pools" be seen. In the electric sword there is much that is scientific and practical. If warfare is really necessary to man's existence, let it be kept as near abreast of the times as possible. Possibly the electric sword may prove an important advance in the construction and use of the great symbolic instrument and enigma of war. But perhaps some genius may yet outdo Franklin by the invention of some form of lightning conductor which will shield an army from a charge of electric words. Something similar has heretofore been the result of all the modern improvements in this direction. One inventor devises some new mode of defense or attack and another inventor immediately brings out some other device to overcome or supercede the latest improvement. It is to be hoped that this mode of procedure will be continued until all modes of warfare become so inglorious or so generally fatal that men will no longer engage in such an inhuman and unnecessary mode of settling international disputes.

LITTLE INDUSTRIES OF THE SOUTH.—Small industries are springing up all over the South. Wagon works, furniture works and works for many other industries in wood and iron are being established to produce at home a large portion of the articles which have heretofore been imported from the Northern and Western States. These minor industries are prospering all over the South where they are properly conducted. The character of the work is improving, and the improving demand for good wagons is leading to further enlargements and additions. There is no good reason why Southern wagons should not sell in Northern and Western markets, and enterprise will yet solve that problem.

SHOP NOTES.

Do Tools Grow Tired?

A correspondent of the *Iron Industry Gazette* says: Tools, like men, grow "tired." I have seen a first class chisel get "tired," and act as though it was possessed of the King of Sheol. It would not keep its edge, and the more I sharpened it the sooner it would lose its edge.

I called the attention of a shopmate, a grizzled old veteran, to the peculiar behavior of this chisel. He looked it over and handed it back to me, saying: "The tool is all right only a little tired. Lay it away and let it rest. It will come out all right again, just like a man who is tired."

I did not believe this old fellow, and I really thought he was crazy to talk of a tool getting "tired," but as there was no help for it the tool was laid away. I do not remember how long it was left to "rest," but when it was again sharpened and used it appeared to hold its keenest edge as well as it did before it got "tired." Barbers tell me their razors in constant use get "tired" in the same way, and woodchoppers say their axes sometimes seem to get "soft" all at once.

Possibly constant and hard usage may cause changes in crystallization that would account satisfactorily for the peculiarity alluded to. Locomotive engineers often observe peculiar misbehavior in their machines, which may possibly be the result of continued heating, friction, and pounding. When a tool gets "tired," or a machine "balky," give each a rest.

Mechanics who are not well informed, in these days of cheap valuable books, have only themselves to blame. Generally the tool handler who "gets on" in the world is the one who has read what has been printed concerning his work. When a foreman is incapacitated by sickness or accident, it is the intelligent subordinates who are called to fill his place either temporarily or permanently.

Orderly Shops and Good Tools.

There are few mechanics who realize the importance of keeping their tools in perfect order; nevertheless the experience of every one having to work with a set of tools ought to prove that he should love his tools and regard them with pride. We sorely recollect a single instance of a really good workman who did not possess this affection for, and pride in, the implements which enabled him to turn out his work well.

If hammers are rusty and with faces covered with careless nicks, and fitted with ill-shaped and broken handles; if sharp-edged tools are badly ground and covered with rust; if cold chisels are made very much like old shanks taken at random from the scrap-pile, and litter, dirt, tools and fragments are clustered together in a close conglomeration, it will convey about the same idea to the observer that a beggar in tattered habiliments would in the parlor of a prince. Every one would feel a great desire to either eject the intruder from the apartment or at once leave the place himself. There are instances where this affection for and pride in implements have gone extremely far and become almost a monomania; so much so that the journeyman could scarcely bear to see you examining his chisels, files, etc., and seemed to have a fear, whilst you were looking at them, of some outward effect like that which the Indians attribute to an evil eye, but which merely arose from a species of selfish affection for these children of his handicraft.

Every tool should have a place and be kept there when not in use. The amount of time saved in a year by having everything in order is astonishing. It often happens that when a job is to be done in a hurry there is more time wasted looking for tools than would be required to do the job. This does not pay, and, besides, the customer goes away in an unpleasant condition of mind, and will not be apt to take another job to that shop if he can help it; but he will be almost glad of the opportunity of visiting the shop where work is done promptly and pleasantly. The people soon find out the best shop to deal at, and the best shop gets the cream of the trade, while the old fogies growl and grumble while the dust is settling on them, which they are too lazy to shake off.—*Mechanics.*

Forty Years Ago.

Forty years ago, in the machine trade, planing machines were the exception; the hammer and the chisel were the only reliance for obtaining plane surfaces. In those days men chipped and filed, and removed pounds of iron by hand, where machines now remove ounces only to accomplish the same purpose.

Forty years ago castings were made much heavier and rougher than they now are, and were not so sound. Pattern-makers were instructed to allow more stock to finish, and blacksmiths compelled machinists to do work on the lathe and in the vise, which should have been done at the forge. Their forgings were rough and covered with scale, and they ran close to the size in places where it was all straight work, and far away from it in others where it was hard work to get the stock off. Forging, in most cases, were only an approximation to the thing required.

Forty years ago the milling machine was unknown. The seed or germ of it was the "slab-

ber," for milling off hexagon nuts and bolt heads. These nuts were often chipped and filed than any other way; but when a specially nice job was required, they were strung on a mandrel and planed.

Forty years ago the lathes in use were poor machines compared to the present tools. The "slide lathes," as it was called, was confined to straight work and boring; anything that required exact workmanship was done in hand-lathes.

Forty years ago tradition ruled in machine work, and book lore had no part or lot in designing or constructing. Men followed the plans of their fathers, and any departure or innovation was but slowly adopted. There were no text-books or hand-books, and technical schools were unheard of.

Forty years ago steam worked expansively was the exception; full stroke was the rule everywhere, and steam pushed the piston to the very end of the stroke, the valve only closing in time to open again. Piston speeds were slow, friction was an enormous percentage of this power, and boiler pressures of 50 to 60 pounds were considered high.

Forty years ago the condition of the machines and workmen was far below what it now is. In 40 years the social status and appreciation of craftsmen generally have advanced. Legislation has had no part in this. Men cannot be voted into intelligence, and an ambition to learn the why and wherefore of their callings. Example and individual achievements have raised the mass. Men have emulated the efforts of others who rose from poverty to affluence by hard study.

The improvements in machinery have also aided the multitude, and the trades stand higher, are more intelligent, more economical, better citizens, in short, than their fathers.—*Mechanical Engineer.*

PULLEY AND BELT.—There is a tendency among machine builders to use pulleys that are too narrow for the belts to drive with, for the reason, perhaps, that a wide-face pulley will give the impression that a large amount of power is required to make them operate; so narrow belts are prepared with the idea that they can be laced up till the machine is set in motion. It would take a great deal of the load from off the bearings if the wide belts could be used, that they may not be strained all out of shape in transmitting power to this driving shaft.

BEARING SURFACES.—Too much bearing surface, if badly fitted and poorly lubricated, may be much worse than too little surface. A notable case illustrating this is said to have occurred in the United States Navy some years ago. In order to provide plenty of bearing surface, the crank shaft was carried in frames 4 feet long, the shaft being about 13 inches in diameter. All the resources of the engineering could not keep these bearings cool, and they had ultimately to be reduced in length one-half.

Good Mining Superintendents.

The greatest need of the Black Hills to-day is of men with experience to superintend and work the mines. The experience of the past in this country, unless it be entirely worthless, will justify this statement. If the money that has been unprofitably and unwisely employed and wasted through incompetent management, and through impracticable undertakings could be estimated it would be found there would be enough, if placed in the hands of good practical miners, to develop the entire resources of the hills. All will agree to this upon a moment's reflection. We have but to think of the enterprises undertaken and abandoned, the hard and costly labor performed and lost, most of which as regarded now was undertaken without due consideration and with but little chance of success from the start, and the wonder then becomes how it is possible that men could act so rashly and with so little judgment in matters involving so much labor, time and money.

The explanation of this is not difficult, however. This was done in times of great excitement, when fortunes were expected to be made in a single year and the lavish outlay of a few hundred thousand dollars in work in any part of this golden region was expected to develop in return a mine with several times the amount expended. Men did not stop to reason calmly or to weigh the chances of success or failure; they inverted almost entirely upon the theory, "nothing risked, nothing gained," which is a true one properly interpreted. It was not meant, however, that the risk should be taken without the slightest consideration of the chances of success.

The superintendence of a mining company is a most important and responsible position, and the man chosen for such a position should be a man of long experience in practical mining. That a man who combines all the qualifications for a successful superintendent is difficult to find is very evident. There are not very many of them out of a job or waiting for an offer. They are picked up eagerly and paid large salaries by companies that understand the value of having such persons at the head of their enterprises. But men of this character can be had by paying them sufficient for their services. They are a restless class of men generally, ready to go to a new place upon a liberal offer and eager to build up a reputation among a new people.—*Deadwood Pioneer.*

STEAM BOILER NOTES.

Softening Your Hard Water.

The enormous waste of fuel, and damage to boilers, consequent on the use of "hard" water, carrying in solution a large percentage of lime, should incite some one to devise some means to purify such water before it enters the boiler, remarks the *Stationary Engineer*. The great expense and loss of service imposed upon railroad companies by the use of lime water in locomotives, should have led to some plan by which this lime in feed-water could be eliminated. That it has not been done effectively before this is occasion for surprise, to say the least. True, we have a vast array of devices and compounds that propose to keep boilers clean, and plenty of testimonials are shown to prove that they do it, but these are remedies, or means, for removing the deposits left when the water is evaporated.

Practical men of experience with steam will admit that it ought to be easier to remove the lime from the water than to clean the scale from the shell and tube, after the heat has caused it to deposit and adhere closely. In view of the general diffusion of chemical knowledge among all classes in this nation, it is surprising that the steam-users and engineers have not given the subject more attention. That carbonates of lime can be removed from water by changing its condition or form, should have occurred to some one before this, and that it can be done easily and cheaply ought to have been demonstrated before this.

The carbonates of lime which makes water hard, is kept in solution by the presence of excess of carbonic acid; now if caustic lime-water be mixed with hard water, sufficient to neutralize the carbonic acid, the lime added and that in solution will be precipitated as lime carbonate, its specific gravity being greater than water. The water being left to stand without agitation, until the lime has settled at the bottom as a white mud, the clear water can be drawn off.

A part of the precipitated lime may be drawn off, if proper precautions and care are not present, to prevent this result. There is no reason why all steam plants and watering stations that are troubled with lime-water cannot adopt this simple and inexpensive plan for securing water that will be cheaper, cleaner, and less damaging than hard lime-water.

EXHAUSTING BACK INTO THE BOILER.—A gentleman in New York has contracted to furnish about \$10,000 for building an experimental engine of recent invention. The invention is nothing less than an engine which shall exhaust back into the boiler, instead of into a condenser or the open air. That is, the steam which has pushed the piston through a full stroke is to be forced back into the boiler by the same piston. If the invention can be made a practical one, it will be of great value, for if the steam can be exhausted into the boiler the loss from friction and radiation will be so small that from 70 to 80 per cent of the fuel used to drive an engine will be saved. The engine consists of four single cylinders, two being placed horizontally, one above the other, on each side of the shaft to be turned by them. The pistons are connected with the shaft, so that the piston in the upper cylinder on one side works in conjunction with the piston in the opposite lower cylinder. Steam being admitted to either pair of cylinders, the pistons are forced out to the end of their strokes and the shaft is turned half-way round. At this instant they are, by means of cogs, two cams and a link, uncoupled from the shaft and connected with each other, becoming as one piston, with the steam pressing equally on each side. At this moment the other two pistons are coupled to the shaft and forced by the steam to the end of their stroke, keeping the shaft turning, and pushing the other two pistons to the heads of their cylinders. The second pair of pistons are then uncoupled and treated in the same way. The theory is said to be correct, but the machine somewhat cumbersome, and perhaps slow motioned.

COPPER VS. IRON OR STEEL PIPES.—The London *Engineer*, in discussing the subject of copper steam pipes, brought up by the explosion on the British steamer *Elbe*, recently remarked: The question deserves consideration. Why use copper piping at all? It is difficult to see what precise advantage it possesses over good lap-welded steel or iron tubes. It appears, moreover, that a very good pipe might be made of thin steel riveted. Such a pipe could not be caulked steam tight, but might be brazed steam tight, its strength depending mainly on the rivets, while the brazing would be a substitute for caulking. Now that a doubt has been cast on the merits of copper for high-pressure work, it is possible that some ingenious individual will produce something as new and as suitable for its intended purpose as the corrugated flue which render high pressure possible at sea.

THE TEST PRESSURES OF MARINE STEEL BOILERS.—At the sessional meeting of the Institution of Naval Architects, recently held in London, Mr. R. Sennett (chief engineer of the admiralty) read an important paper upon "Working and Test Pressures for Marine Steel Boilers." He explained that the old bad traditions in regard to testing boilers had been

shaken off, though their influence was not yet dead, and by slow degrees it had been realized that the ordinary rules of mechanics might be applied to steel boilers as safely and as surely as to any other structures. The "factor of safety" in the working steam pressures allowed to be carried with a given thickness of plates, was to a great extent an allowance for want of knowledge. But the necessity for this no longer existed, since with the introduction of high steam pressure and steel plates much greater attention was now paid than formerly to materials and workmanship.

CAN A STEAM BOILER OR PIPE BECOME HOT ENOUGH TO IGNITE A MATCH PURELY FROM HEAT, WITHOUT THE LEAST POSSIBLE FRICTION? At what heat would it ignite, and what would be the highest number of degrees of steam heat that could be brought to bear upon the outside of a steam boiler under pressure? Also, could steam pipes set fire to anything else? A. A phosphorus match will ignite at 140 degrees Fahrenheit; steam at the boiling point is 212 degrees; under high pressure of 240 pounds to the inch steam can be heated to 403 degrees, but this is not hot enough to set fire to wood, as dry pines wood ignites at 500 degrees, and charcoal at 580.—*St. Paul Pioneer Press.*

Nevertheless we have seen it! A pine board laid on pipes through which super-heated steam was passed from the boiler to an oil retort charred black in a few hours. The woodwork on which heating pipes were hung 300 feet from the boiler became so charred that the screws let go and the pipes fell down. We can cite actual occurrences by the dozen.—*Insurance Monitor, N. Y.*

STEAM VS. WATER POWER.—The cost of steam power in small amounts is greater than in large amounts, but for mills requiring 500-horse power or more as economical results can be obtained with steam as with water, in almost every case. To this add the advantage of a uniform steady power, independent of the rise and fall of a river and the saving which this may mean; also consider the better results attained by steam power and we can plainly see why this statement is practically proved at Fall River and elsewhere, and there is no better proof than this that steam mills can successfully compete with other mills driven by water power.

THE CORLISS VS. SLIDE VALVES.—The fact that a long-stroke Corlies engine is more economical than the best constructed slide-valve engine is sufficiently proven by the further fact that a good Corlies engine will, for a term of one year, five years, or any number of years, save one-third the fuel required by the best slide-valve engine ever built to develop the same amount of power, running under the same conditions. There are numerous instances where the change from a slide valve to a Corlies engine has demonstrated this to be a fact; but no instances where any gain in economy has resulted from changing from a Corlies to a slide-valve engine.

TO PREVENT FOAMING.—The evil effects of foaming may be in a measure remedied, and much drier steam delivered to the engines by using flaring connections on the boilers with wide mouth for the entering steam. The action of steam flowing from the comparative quiet of the boiler to the high velocity in the pipe produces something in the nature of a violent suction at their connection. In the opening where this suction is small the intensity is concentrated so that water is likely to be drawn over in the form of spray, while if the opening is large the steam starts gradually, leaving more time for the water to separate and fall back.

TO AVOID TEARING THE MANHOLE GASKET.—On opening a boiler much trouble is often experienced from the tearing of the manhole gaskets; this may be avoided by putting a little white lead on the face of the gasket that rests on the manhole plate, and by chalking heavily the other face of the gasket, as also the part of the manhole frame with which it comes into contact. On subsequently opening the boiler the gasket will generally be found to adhere firmly to the plate and to separate from the frame without tearing.

REPAIRING STEAM PIPE BREAKS.—An ingenious means of repairing a break in a steam pipe consists in hindering the break with wood strips, laid close together, and well served around with stout cord or rope, endwise separation being prevented by more rope crossing the break diagonally, and tied so as to draw the broken parts together; on the wood and the cord getting wet with steam, the joints become even tighter than before, as the wood swells and the cords shorten.

CASTOR OIL IN BOILERS.—A writer in the *American Machinist* recommends the use of castor oil in boilers where alkaline water is used. He says that from two ounces to a pint of oil will prevent foaming all day. The oil is put in after the engine shall have started if foaming shall begin.

WASTE SILK has been shown to be the most effective non-conductive covering for steam pipes. The price is high, but the demand is very great.

COTTON AND WOOL.

Evolution of Cotton Seed.

Was ever there a history, this side of Cinderella, of the uprising of humility, like that of cotton seed? See!

For 70 years, despised as a nuisance and burned or dumped as garbage; then discovered to be the very food for which the soil was hungering, and reluctantly admitted to the rank of ugly utilities.

Shortly afterwards found to be nutritious food for beasts as well as soil, and thereupon treated with something like respect.

Once admitted to the circle of farm husbandries, it was found to hold 35 gallons of pure oil to the ton, worth, in the crude state, \$14 to the ton, or \$40,000,000 for the whole crop of seed.

But then a system was devised for refining this oil up to a value of \$1 a gallon, and the frugal Italians placed a cask of it at the root of every olive tree and then defied the Borean breath of the Alps.

And then experience showed that the ton of cotton seed was a better fertilizer and a better stock when robbed of its 35 gallons of oil than before, and that the hulls of the seed made the best fuel for feeding the oil-mill engine. It was next discovered that the ashes of the hulls scooped from the engine's drift had the highest commercial value as potash, and that the "refuse" of the whole made the best and purest soap stock to carry to the toilet the perfumes of Lubin or Colgate!

About this time people began to spell cotton seed with capital letters.

Next it traveled abroad in its various dresses. As meal cakes it whitened the meadows of England with woolly fleeces and fattened the British cattle under the oaks; it spattered on the stoves of the Dutch in lieu of lard; it glistened in the cafes of Paris as olive oils under seals and signatures it couldn't even pronounce to save its life, and from under the dikes of Holland it went forth to parade in all the bravery of butter and butterine.

In our own country it removed the wasting strength of Southern fields and clad them with whiteness that would shame the fleeces of England, or yellow that would pale the fleeces of Argonauts. It knocked the Western hog into spots and ponied the Western lard out of the fryingpan into the fire. It furnished the Armours and Fairbankses with a pure substitute for the rancid fat they had been shipping us, and suggested the possibility of a clean and cheap lard.

And about this time Congress jumped on to cotton seed with both feet, and proposed to check its further career by a prohibitory tax.

And now comes a gentleman with a process by which he extracts 30 gallons of fine oil from every ton of cotton seed meal after the oil mills have done with it. In the "tailings" of the oil mills he finds this unexpected and ample store, which he deftly extracts with naphtha, leaving the meal more nutritious as food for beast or field than before he took \$10 per ton from it. This invention will add 40 per cent to the quantity of oil taken by the old process from a given quantity of seed.

More than this, it suggests the splendid possibilities yet undeveloped for this rare Cinderella that has risen all so swiftly from the ashes of the waste heap.—*Atlanta Constitution*.

Reclamation of Waste Products in Wool Scouring.

Too little attention is paid in this country to the reclamation of waste products in most of our manufacturing operations, and none, probably more than in the washing and manufacture of wool. Our French and German competitors are far ahead of us in taking advantage of any new discovery in connection with the industrial arts; in fact, almost all new discoveries and their application to the industrial arts are the product of European brains, and with all our boasted go-aheadness as a nation, we are behind the times in a great many respects. These are facts which cannot be denied.

Wade's *Fibre and Fabric* refers in this direction to a patent which has recently been issued in France to M. Marx for a new process of utilizing the residue from wool scouring, by which the waste liquor is passed through a coarse cloth stretched on a wooden frame formed like a baker's trough, by which all the wool and coarse matter in suspension are removed. The waste is then allowed to overflow into a gutter of masonry which is partially barred at intervals by blocks to arrest the solid matter in the form of mud, which is then sold as a most valuable manure. The water is then received into a large cistern, where it rests for several hours, and deposits the rest of the matter in solution. It is then drawn off by a pump into a wooden vat, and is mixed with sufficient hydrochloric acid to saturate the free alkalis and that which forms part of the soap, decomposition takes place, and deposition in three layers. The middle layer, which has a milky appearance, contains various animal matters; the upper and lower layers contain fatty acids and also a matter the same as the middle layer. The middle layer is conveyed into a cylindrical vessel charged with large pieces of limestone which disengages the hydrochloric acid from its first combination, forming chloride of lime,

which remains in solution. From this vessel the water runs into another containing milk of lime, with which it is mixed until there is a decided disengagement of ammonia. The solid matters then fall to the bottom. The two other layers, now mingled by the withdrawal of the middle one, are thrown upon another filter of the same kind which retain the fatty acids.

The development of this industry is due principally to Mummé and Rugelet, whose process in operation at most of the great seats of wool manufacturing is very simple. They evaporate the waste liquors to dryness and place the residue in retort and distill it in very much the same manner as coal is distilled at gasworks. The result is that while much gas is evolved, which is used to light the factories, and much ammonia is expelled, which is collected and used in many ways, there remains a product consisting of carbonate, sulphate and chloride of potassium. These salts are separated by the usual method and pass into commerce.

It has been shown by Chevreton that the wool yolk forms at least one-third of the weight of raw merino wool, and that this wool yolk is a peculiar potash compound which the sheep draw from the land on which they graze, and which is eventually excreted from the skin along with the sweat. According to Mummé, a fleece weighing four kilogrammes contains 600 grammes of grease, in which is 193 grs. of pure carbonate of potash; and according to data published since, 1000 kilogrammes of wool yield 140 to 180 kilos. of dry salt or 70 to 93 kilos. of potash. At the wool-washing works of Döhren, near Hanover, they get 152 kilos. of raw potash out of five tons of wool, and it contains 80 per cent of carbonate. In 1867 Mummé and Rugelet produced at their works at Rheims and Eberf 150 tons of pure potash from grease, and there are similar works at Roubaix, Antwerp, Vorviers, Liège, Bruges, Hanover, Döhren and Bremen.

These are facts that cannot be denied, and as this industry is in successful operation in France, why cannot it be done in this country and in this State as well, and these valuable products that are at present going to waste and polluting our rivers and streams, be reclaimed and utilized?

COTTON CULTIVATION IN RUSSIA.—Russia, it appears from the statement of the *Novosti*, imports annually 360,000,000 pounds weight of cotton, chiefly from America and Egypt. The recent acquisitions in Central Asia of the Czar are said to have given him territory well suited to the cultivation of this article, and the Russian papers are asking why the country should continue to pay 100,000,000 gold roubles to the foreigners when they can grow it at home. Some Asiatic cotton from Khiva and Bokhara has already been sold on the Russian market, but the prospect from the new plantations on the Murghab is still more promising and abundant. The Czar's domain on that river, where General Puckled and the expert M. Poklevsky Kozell have been making experiments, is considered especially well suited to this particular cultivation. M. Poklevsky believes that after the restoration of the Sultan Bey dyke this tract alone will be sufficient to supply the whole deficiency of the Russian Empire. The preliminary essential to these operations is the completion of the irrigation works, and as these will occupy the next two years, it is uncertain till they are achieved whether cotton or some other crop will be the most remunerative.—*Cotton Factory Times*.

OUR AMERICAN ANGORA.—The foundation of the American Angora flocks was imported from Asia. Richard Peters of Georgia, we believe, was the one who brought the first into this country. Fehulous prices were paid for these animals. The stock was introduced into California and Texas, the now principal Angora districts of America. For years these breeders have found a larger demand for their mohair than they could supply, high prices were realized, and the majority of those engaged in this industry have become wealthy. Of late, however, the prices for hair have declined so that many have abandoned the business. We do not think that any goats have been imported for some years past. Do not see why it cannot be made profitable; they require much less care, and will subsist on food that sheep will not touch. They are much harder than the hardest of sheep. Hair sells all the way from 35 to 50 cents per pound. We cannot see why they could not be raised with success in the Southern and Southwestern States and Territories.—*Sheep breeder and Wool-grower*.

THE QUALITY OF COTTON.—The cotton brokers declare that the cotton now in use in Fall River is the best that was ever landed there. If this is so, and there is little reason to doubt the brokers, the spinners have lost one of their causes of grievance. Some of the members of the Spinners' Union had made plans to ask the manufacturers for better cotton during the summer months, but this will not now be necessary. The manufacturers have come to the conclusion that the best is the cheapest in the long run. The mills are prosperous and there is a strong probability that business will be good and the factories running full time.—*Ex.*

COTTON-MILL BUILDING in the South is being pushed with almost blind zeal. Within two months announcements have been made of 60 new mills. One at Athens is to double its capacity from 5000 to 10,000 spindles. A

thread factory is to be built near Barnett Shoals, Ga. A Merchantville, N. J., projector will put up a large amount of knitting machinery at Morristown, N. C. Spartansburg, N. C., is to have a \$100,000 mill.—*N. O. Times-Democrat*.

SHEEP SHEARING is actively progressing in Eastern Oregon, and wool is already being hauled to points on the railroad. The clip being hauled to Arlington and the Dulles is in fair condition. The staple is better than last year, except from localities where the ranges are crowded. Umatilla and Snake river wools are average in appearance. Union and Baker counties show a heavier clip, owing to the introduction of better blood. Grant county wools are light, and on the whole the clip of Oregon may be considered five per cent heavier in shrinkage than last year, but wools classed as railroad wools by the trade are as much as 10 per cent heavier.—*Portland Chronicle*.

EVOLUTION.—The cotton seed become cotton, the cotton becomes thread, the thread becomes a fabric, the fabric becomes a print, the print becomes a wrapper, and the wrapper becomes a beautiful woman.—*N. Y. Sun*.

Flour Mill Notes.

A Flour-Mill Run by Electricity.

Some Very Remarkable Results Obtained by this Power.

The *Electrical World* gives an illustrated description of the Laramie Wyoming Milling and Elevator Company's flour-mill, operated entirely by electric power.

The mill is a fine specimen of design and workmanship throughout. Its capacity is 100 barrels of flour per day, and it turns out work in this proportion regularly, without crowding.

The mill is equipped with steam heat, the Edison electric light and Sprague electric motors. These motors are used exclusively for the power to drive the mill. All parties interested are entirely satisfied with the power now in use; it is not probable a change will ever be made in this respect. The mill machinery consists of seven double sets of rolls 7x18 inches each, with purifying machinery of a capacity equal to the rolls.

The power is divided in units of 25 horsepower each. One motor in the corner of the building drives all purifying machinery on the floors above, also the wheat (cleaning) machine, and all elevators and conveyors, which, if they were all stretched out in one line, would measure over a mile in length. The other motor runs the seven double sets of rolls and the flour-packers.

From the experience gained, Mr. Jones, the manager, would advise mill-builders who use electric motors to subdivide their power into three units, by taking all wheat-cleaning and scouring machines, and all elevators and conveyors running directly in their interest, from the purifier line, and to apply a motor of proper capacity directly to them by means of a countershaft. This he would suggest owing to the intermittent use of these machines, especially where the wheat-dampening process is used.

He maintains that he has a lower percentage of loss of power than he would obtain from an engine placed in a building prepared for it alongside the mill, counting the necessary loss by friction in running long shafting and belts, as is invariably done. The arrangement just suggested, a subdivision of power into three units, would reduce the friction and be preferable, as cleaning machines could remain idle much of the time; and, besides, the present quantity of shafting and belts would necessarily be reduced.

Remarkable Results Noted.

The motors in the Laramie mill run at constant speed. Mr. Jones states they are more constant as to any sudden change than the best-regulated automatic engines in the market. The only change they are subject to is a gradual, but slight, increase in speed from the time of starting until the day's run is complete. This increase appears to be due to an increase in the temperature of the armature, and has been found to be in these proportions: Thus at starting the roller line shaft makes 219 revolutions per minute, which is the right speed, at night the speed has increased to 224 revolutions, and at intervals during the day the speed varies in almost true proportion, which result is more uniform than engines will give.

The motors are wound for 220 volts, but are run at 226 volts, and it requires in current an average of 150 amperes to drive the mill to its full capacity. A variation of pressure on these machines will vary the speed in about the same proportion as steam pressure will vary the speed of the best engines. So far as observed, a variation of one volt electrical pressure will produce about the same effect on the motors as one pound of steam pressure would vary a good automatic engine. However, it is easy to control electrical pressure to within one or two volts, while it is difficult to control steam pressure within the limit of a few pounds, which shows that the motor is superior as to variable changes in speed.

Electricity in an Iron-Rolling Mill.

Mr. Jones has been so well pleased with the work of the electric motors in the flour-mill that he has recently placed a 20 horse power Sprague motor in the Laramie rolling mills,

which now runs about 120 feet of three-inch shafting, containing many heavy pulleys. This shaft drives four spike machines, two bolt shears, two nut presses and a large quantity of threading and tapping machinery, including some emery heads. It takes less than 20-horse power to drive this shaft, and it delivers a uniform speed to all machines. Previous to placing this motor, the power was transmitted nearly 300 feet by belts and shafting, and probably required nearly 50-horse power to do the same work now done with less than 20.

How the Motors Increase the Working Capacity of the Men.

Careful observation has shown that the rolling-mill men are doing much more work now than by the old-belt system, owing to the fact that during much of the time speed was so slow, caused by low steam, that some of the machines had to be shut down.

A Flour Trust.

A convention of the flour millers of the United States met at Buffalo, N. Y., during the past month. It appears from the proceedings, so far as we have received them, that the millers have also fallen into the general desire to form a "trust." The proposition is to enroll all the leading millers of the country into the organization. When that is done the organization will be in a position to dictate the price of wheat and flour for home consumption, and another price, if deemed advisable, for export. The plan also involves the abrogation of the present 20 per cent tariff on foreign wheat. This is simply a new movement to place the control of the bread stuff of the country in the hands of a few speculators; a movement much more easily effected and involving far less capital than the "corners" in wheat heretofore attempted, that is, provided the proposed organization can be accomplished.

The *Call* of this city comments upon the matter as follows: "They," the millers, "want the duty on wheat removed. It is not necessary to travel far a-field to discover what the object of the last proposition is. The millers in convention ask no less than that the American farmer shall be delivered over to them bound hand and foot. This is what the woolen manufacturers were encouraged to do with regard to the wool-growers—the fruit-canners in the matter of tin plate to the fruit-growers. The 20 cents per bushel now charged as duty on Canadian wheat saves our farmers from the clutches of the millers just to that extent. If the duty were removed they would have to come down to Canadian prices, when transportation charges were equal. Our farmers would lose what may be called the border trade in wheat altogether. Canadian wheat can be laid down more cheaply in Buffalo than wheat from the interior of the State of New York.

But the special point to be noted is that the millers do not think that they can succeed in setting up their "trust" unless the duty on wheat is repealed. They want to use foreign wheat as a club to beat down the prices of our own farmers. But President Cleveland gave expression to the opinion in his last message that it is the tariff which has made "trusts" possible. Some of his defenders have asserted that it was the 75 cents per ton levied on coal which has sent the price in this city from \$7 to \$17 per ton. Other wholly wonderful results have been noted in other parts of the field. But the millers in convention have knocked the bottom out of the absurd notion. The "trusts" which are strongest in this country are those which are least protected.

British and American Wheat-Growing.

The English economists are puzzled by the problem presented by wheat cultivation in India. To that they ascribe many of their woes and many of the uncertainties of the future. The first export of wheat from India was in 1868, and the quantity was 559,000 bushels. There was a slow increase for a few years until 1876, when the amount was 4,687,000 bushels. In 1881 the amount was 13,896,167 bushels. For the six years, 1882-87, the average export has been 35,530,000 bushels. In the earlier years most of this wheat went to Great Britain, at least four-fifths of it; but latterly, say 1882 to 1887, the proportion has been less than one-half. The price of India wheat at the place of export has been a few cents less than that of our wheat, but the ocean freights have been about as much in favor of the American product and on arrival the latter is found to be cleaner and better, and is not prejudiced for best uses by the India grain. Much has been said and written concerning the possible rivalry between the wheat product of India and that of the United States, and the possible expulsion of the latter from the markets of Europe. This possibility may be regarded as very remote for various reasons; such as the imperfect methods of culture and harvesting in India, the cost of interior transportation, the inferior quality of grain, the necessity of irrigation, etc.

India raises one bushel to a head of the population, the United States, even. India has one mile of railroad to 20,000 people, the United States one to 435. The people of India require by far the largest proportion of their wheat production for food and seed (and their home appetite increases every year) while the people of the United States, after appropriating five bushels per capita, have a surplus for export equal to one-half the entire crop of the British Empire in the East.—*American Agriculturist*.

Coast Industrial Notes.

THE Tanners, Curriers and Finishers' Union of this city now numbers some 200 members and is making rapid progress.

THE cultivation of bamboo for fencing material has been begun in California. It is said that an acre will produce pickets enough each year to make six miles of fence.

ONE side of the Pacific Lumber Co.'s mill at Scotia, says the *Humboldt Standard*, has been shut down to remain until there shall be an increased demand for lumber. We are told that some 140 men are thrown out of employment by these suspensions.

THE Puget Sound Loggers' Association has unanimously agreed to curtail one-third the output of logs for the balance of the year, commencing July 1st. It was generally agreed that too many logs were being put on the water to keep prices at living rates. This association represents three-fifths of the logging interest on Puget sound, and the action taken will make a difference of 80,000,000 feet in the output for the rest of the year.

A LETTER from Sutter Creek, Amador county, says: "Operations have commenced at the new sawmill of Tarr Bros. They say it works charmingly, and is good for 15 years. In fact there are not many better to be found in the State. The supply of first class lumber being abundant, this mill ought to do a rushing business, notwithstanding that it is further off than the other mills. An excellent road all the way obviates to a great extent the extra distance."

FORTY-FIVE THOUSAND shingles manufactured at the Frazier mill, says the *Visalia Times*, were brought to this city on Tuesday last and sold to the San Joaquin Lumber Co. This is the largest lot of home-manufactured shingles ever brought to this city at one time. Heretofore the shingles on sale in this county have been manufactured on the coast or in Washington Territory, but now that our own people have engaged in their manufacture the money to be expended for them will be retained at home.

THE California Sash, Door and Blind Manufactory, located in West Oakland, which has the largest capacity of any in the State, has been closed. How long it will remain inoperative is not known. The mill is owned by a syndicate of capitalists of San Francisco, B. and J. S. Doe being prominently interested. The factory was formerly operated at San Quentin by convicts, but after San Quentin authorities refused to take this work longer, the company built the West Oakland mills.

MAY was the banner month of exports from Puget sound, surpassing all others, 38,302,816 feet of lumber being exported from the nine ports of the Sound. Tacoma was in the lead, shipping 9,985,215 feet. The coal shipments were 57,842 tons, Seattle leading with 36,520 tons, and Tacoma shipping 21,340 tons. The total exports from Tacoma for the month of May, including lumber, coal, wheat, flour and merchandise, are valued at \$434,540, and from all the ports, \$1,215,270. The tonnage was 88,568.

THE San Bernardino *Index* says: The San Bernardino, Arrowhead & Waterman motor road has been completed as far as Harlem, and henceforth regular trains will be run to that popular resort. The timber industry alone would justify the building of the road, to say nothing of the local traffic. It will enable the timber-growers and millmen in the mountains to place their timber in this market several dollars per thousand cheaper than at present, the only transportation now being by means of freight teams.

THE new steel steamer Pomona, just completed by the Union Iron Works of this city, will be put on the San Francisco and San Pedro line, in place of the Los Angeles, which latter steamer goes in the northern coast trade. This new steamer is 240 feet in length, 33 feet breadth of beam, 18 feet depth of hold with a registered capacity of 1,445 tons. She will contain 45 staterooms, 35 of which will be on the deck and 10 in the saloon, and will have a speed of 15 knots per hour, and will be equipped with electric lights and electric bells. In finish, improvement, and for comfort and convenience she will not have a superior on the Pacific Coast.

THE *Tribune Independent* says that the steam traction engine destined for logging at the Empire mill arrived all right. The tests were successful. Considering that the engine was only guaranteed to haul 14 to 16 tons on a dead level, this test of hauling 18 tons up a grade of 1 1/2 inches to the rod, and the second test of hauling 12 tons up a 25-inch grade—which usually requires eight stout bores to do—was more than satisfactory. More than this, no such heavy grade exists where the engine is to work, and no more than eight tons at a load will be required. The load was four times the weight of the engine.

ON Pine ridge, Fresno county, Musick's mill is running and so is the old Donaboo now O'ken-don's, and the Bennett mill also. John Humphreys is putting in a new mill of large capacity about two miles beyond the Musick mill in a body of splendid timber, on what is known as the Reynolds' place. One feature of the lumber business this season, while entirely satisfactory to the millmen, is going to create a bad feeling among those who have been expecting to buy lumber at the mills and haul it direct to where they wish to use it, and that is, that nearly the entire out of the present season is

sold in advance, and the sawing will all be to order of the purchasers.

ETNA, Siskiyou Co., formerly called Rough and Ready, is situated at the base of Mount Etna, a mountain of 9000 feet elevation, and a peak in the great Salmon range, about midway and on the west side of Scott Valley, Siskiyou Co., Cal. Nestled beneath the shadow of this great mountain range, with the beautiful, rich fertile valley stretching out to the south, east and north, makes its site grand and picturesque. The town is noted for its water-power and milling facilities, there being formerly three grist mills and two sawmills besides other small factories. It is the base of supplies for the extensive Salmon River mining district, all the supplies being packed on mules from Etna into this mining region.

THE report of the Board of Survey on the Monongahela, now at the Mare Island Navy Yard, says: The general condition of the Monongahela is fair. She is very suitable for a store ship. An extension of the herb deck, as recommended, would add to her efficiency as well as strength. The board estimates the cost of labor and material to refit her for her present duty to be about \$45,150, or a little over 13 per cent of the estimated cost of a new ship of the same size and like material. The Bureau of Construction recommends that she be refitted in accordance with the recommendation of the board, and requests authority to proceed with the work at an early day, as any delay will increase the cost.

IN speaking of the Willow Brook shingle-mill the *Humboldt Standard* says: "The plant and buildings are all new, commodious and convenient. A 35 horse power engine moves the machinery. The shingle machine is the Perkins' patent; 60,000 shingles are made each day. The shingle saw makes 1900 revolutions per minute and the holt saw 1000. The mill was erected by John McAfee, who is now the engineer. Chas. Armstrong is general manager; Willard Wilson runs the holt saw; C. Perrott is joiner; packers, H. Mooney and L. Winstead. The last named will pack from 40,000 to 45,000 shingles per day and do it in splendid style. He is one of the most efficient men in this line in this State. Seven men are employed about the mill and five in the woods."

COL. WAKING has completed his plans for a system of sewage for San Louis Obispo, has placed his reports, maps, estimates, etc., in the hands of the city board of trustees, and now awaits the further action of the community. It can hardly be doubted that no error is possible in the plan so far as relates to the gathering of the sewerage in the city. It is comprehensive, taking in the whole town site, from Palm to Loyal streets, and from above the Ramona to the depot. It can be extended as necessity demands to sewer every dwelling in the city limits. It is not too extensive in its scope for present needs; but it involves no construction which will not be valuable and essential should the city grow to five times its present dimensions. Every part of the city is alike sewered, and is interested in having the entire system constructed.

THE San Diego iron and nail manufactory is located at Roseville, and the immense buildings to be occupied are nearing completion. These buildings will cover four acres of ground, and will be very substantial in character. Four hundred thousand feet of lumber was used in their construction, and it took 20 tons of corrugated iron for roofing. When in working order the factory will use 25 tons of iron and turn out 500 kegs of nails daily. One hundred men will be employed. The company has a capital of \$250,000. The officers are, president, N. H. Conklin; vice president and secretary, Col. W. J. Farrow; treasurer, Bryant Howard; general manager and superintendent, G. P. Clapp. Directors, E. W. Bushyhead, F. W. Putnam, E. W. Hendricks, J. A. Allison.

A LARGE force of laborers is now kept at work by the Contra Costa Water Company laying new pipes and mains in the many growing districts on the outskirts of Oakland. During the past week between 3000 and 4000 feet of two-inch pipe has been laid in the northern part of the city, in a district that but two years ago was only marked by an occasional house. Now, however, with the subdivision of the large tracts of land formerly held by individual owners—such tracts as Paradise Park, the Watt's tract, Harmon's and others—the increase in house building has been truly wonderful. Until recently these districts were without city water, the company not deeming it a profitable investment to lay pipes. So the newcomers were obliged to sink wells, many of them at considerable expense. There are instances where the wells, pumps, windmills, tanks and franchise have cost individual property owners as high as \$1000.

MR. J. B. PUGSLEY of St. Paul, who is now interested at North Yakima, says that in addition to the Griggs Lumber Co. and others reported in the *Takoma* papers, who will erect large mills on the sound, nearly all of the large lumbering firms along the upper Mississippi river anticipate putting up mills in Western Washington. The reason of this westward movement on the part of lumbermen are many, among which he names the fact that the lumber has been cut out of woods which are readily accessible in the Northwestern States, and that the timber there yields only about 20,000 to 40,000 feet to 40 acres, while in Western Washington the product is from 100,000 to 300,000 feet

to 40 acres, and that the price of logs on the stump in the East is from \$1 to \$3 per thousand, while out here it is from 50 cents to \$1 per thousand feet. The intention is to ship large quantities of lumber from Western Washington Territory to the markets of the East.

SOME of the numerous men from the East who have come to buy timber-land, feel a little nervous when they see the size of the Oregon trees. They have had no experience in handling such logs or in cutting them. They realize at a glance the vast difference between sawing up a log of tough fir five feet and a soft pine log two feet in diameter, and know that different modes of transportation and different machinery must be used here from what they have been accustomed to. They however, realize the value of our timber and the large amount of it on an acre. In regard to the lumber being brought to Denver from New Mexico and Texas, which has shut out our lumbermen from that market, one of these men says that millmen take portable saw-mills into the woods there and hire colored men for 80 cent per day, and the trees being comparatively small but tall and straight, make a good quality of lumber very cheaply. Before our lumbermen can compete with them they must have a very considerable reduction of freight rates.

THERE has been more than usual activity in the basalt block interests of Sonoma the past year. New quarries have been opened in order to meet the demand for basalt blocks to pave the streets of San Francisco, Stockton, and other large cities on the coast. Owing to the fine quality of the rock and the comparative light cost of shipment, and owing to the accessibility of Sonoma quarries to San Francisco, there is a constant and growing demand for blocks. This industry gives remunerative employment to a large number of men the year round, and is by no means a small source of revenue to the Sonoma Valley railroad, which carries the blocks to Dr. Schue Landing from whence they are shipped by schooner to San Francisco. From Jan. 1, 1887, to Jan. 1, 1888, there were shipped over the above railroad 22,458,180 pounds of paving blocks. Each block weighs between 20 and 27 pounds and the number of blocks shipped in 1887 amounted nearly to 1,150,000. The shipments from last January to date have aggregated 6,529,600 pounds. The magnitude of this business may be better understood when it is stated that the value of the blocks shipped in 1887 amounted in round figures to about \$84,000, and it took 1490 flat cars to transport the blocks to Sonoma Landing.

THE foundry and machine-shops of George G. Allen, Nevada city, Nevada county, has been in existence since 1855. The business of the foundry consists principally in the manufacture of steam-engines, hoisting and milling works, castings for quartz-mills, amalgamating pans, water-wheels, and other mine supplies. The works are capable of turning out the heaviest kinds of quartz-mill and machinery used around mines. The buildings are extensive and all the appliances are complete. The machine-shop proper is 80x40 feet in dimensions. In this department is a complete outfit of lathes, planes, drill-presses, bolt-cutters, etc., capable of doing the heaviest as well as the lightest kinds of work. At the present time there are but 12 men employed, but when the works are running to their full capacity, 35 find employment. At the present time the force is engaged in casting mortars for quartz batteries, after the Delhi style known as the Collins pattern, which are said by experts to be the finest yet made. A pump and boiler for Bloomfield are ready for shipping. A hundred 12 inch car-wheels for the Derby mine at Bloomfield are now finished. Four iron cars for the Maozonita are also ready to be shipped. Castings for the Rocky Glen, California, Washington, Blue Bell, Yuha and Delhi are being made. The foundry has frequent orders from the North Star and Empire mines of Grass valley. Work has been slack of late, but orders are now beginning to come in and things will soon be in full blast.

THE display of California goods at Melbourne will be better than was expected. The following is a complete list of exhibits to be sent, with the names of the exhibitors, from the Pacific Coast: From the San Francisco Produce Exchange, an elegant oaken cabinet containing samples of all cereals dealt in by the Exchange. Mining machinery from the following firms will be an important feature of the exhibit: Park & Looy, H. P. Gregory & Co., F. A. Huntington & Co., Pacific and Risdon Iron Works, Joshua Hendy Machine Company, E. G. Dennison, and San Francisco Novelty and Plating Company. Flour mill machinery from Joseph Wagner & Co., and the California Screen Company, together with agricultural implements from Baker, Hamilton & Co., will complete the mechanical display. The other exhibits will be of mixed paint from the California Paint Company; patent shades from E. H. Marwedel; leather goods from S. Blom & Co. and A. M. Kron & Co.; gloves from the Leak manufactory; ophology from C. M. Pum; wines from Alf. Greenbaum & Co. and Arpad Haraszthy & Co.; tulle life preservers from C. J. Hendry; salted fish from Lynde & Hough; honey from Schacht & Lemke; earth oils from Woodbury Oil Company; candies from Ehrenfort & Rothschild; doors from Sierra Lumber Company; wine casks from R. Armstrong; silk thread from Carlson, Currier & Co.; rope and cordage from Tubbs & Co.; cotton flour sacks from Neville & Co.; borax from the Pacific Borax and Salt Soda Company; laundry etarob

from J. Everding & Co.; sewer pipe and brick from Clarke & Son; consolidated soups from Consolidated Food Company; pianos from T. M. Antiehl & Co.; compressing machinery from W. S. Duncombe & Co.; butchers' supplies from California Casings Company; saddlery from Hart & Braodenstein; canned salmon from Dalafald, Morgan, Kissel & Co., and G. W. Home & Co. Geo. W. Meade & Co. will make a large display of dried fruits, and there will also be an extensive display of raisins from A. B. Butler of Fresno, and olive oil from Ellwood Cooper of Santa Barbara. California hops from Lillenthal & Co.; germea from Sperry & Co.; mustard from the Hudson Manufacturing Company; leather belting from A. D. Cook; canned meats from A. Man & Co.; and a large display of perfumery by the Western Perfumery Company, will complete this splendid array of California's products.

STOCKTON is shortly to have a new manufacturing industry, and one which will give employment to a large number of men. The Stockton Combined Harvester Works, of which corporation Mayor Shippee is at the head, is going into the business of manufacturing railway cars. Mayor Shippee was interviewed upon the subject, and said it was true that the corporation had decided to engage in that business, in conjunction with the manufacture of agricultural machinery. In fact, they were at work now making the necessary additions and modifications in their already large establishment. He went on to say that the association had every facility for the business. With few exceptions the machinery necessary for the construction of railway cars was the same as that used in the manufacture of harvesting machinery. The only thing they would have to get was a large power press. Mr. Shippee said the company had on hand a large quantity of lumber which had been seasoned for two years, and which was just the material for cars. He thought that everything would be in readiness to commence operations by the 5th of next month. Mr. Shippee said that it was the intention to manufacture all kinds of railway cars, both passenger and freight, also street cars and cars for motor roads. He predicted that before a year had elapsed the new industry would be the means of giving employment to three hundred men. They already have a contract with the Southern Pacific Co. to build 100 cars.

Good brick clay is found in this vicinity, mainly on the bay shore in Marin county, between Point Tiburon and San Rafael, and in Contra Costa county between Point Isabel and Point Pedro. The deposits on the Marin county shore are about worked out, but on the Contra Costa side there are several in operation. New deposits of brick clay have been found in the hills back of Fruitvale, Alameda county, and a successful industry is promised there. Brick can be made on the ground and shipped to Oakland by the new Alameda County Railway, and thence by schooner to this city at a very low freight rate. The deposit is a large one and it is said to contain some of the finest clay yet discovered in this State. In view of the fact that our contractors and builders have been loud in their complaints of the poor quality of brick supplied to them recently, it will be a source of satisfaction to be able to get good brick from a readily accessible point. The discovery of the deposit was made by the working force on the Alameda County Railway. J. H. Woodward, who is president of the company, says that steps will at once be taken to develop the deposit and start a brickyard on the ground. He thinks that the discovery is a valuable one, and that the industry will prove very profitable. The deposit is on the Laundry Farm in the vicinity of the Mills Seminary. If the demand for good brick continues at the present rate the owners of the deposit will feel justified in erecting works from which they can turn out from six to ten carloads a day.

THE result of the experiment of illuminating the Crown Mills at Stockton, San Joaquin Co., with natural gas has proved entirely satisfactory to the manager, Mr. Welsh. The interior of the building is illuminated by means of 36 powerful incandescent lamps of the latest improved pattern, situated in different departments of the mill. The flame is much brighter and steadier than that produced by manufactured gas. The lights burn without the slightest flickering. The grinding department, containing 40 double sets of rollers and seven run of stone, which requires plenty of light, is supplied with six lights. The packing, bolting and purifying departments, on the third, fourth and fifth floors, are each supplied with three lamps, which furnish all the light necessary to carry on the work of each department. The well from which the supply of gas is obtained is located on the north side of the mill close to the building. The work of boring it was commenced last August, and at a depth of 1000 feet below the surface the present supply of gas was struck. The depth of the well is now 1330 feet and the cost of its construction about \$2500. The total cost of introducing the natural gas to the mill and utilizing it for illuminating purposes will not exceed \$3000. Mr. Welsh explained that the gas that was left over after illuminating the building was run under the hoilers and used as fuel. The company, at the lowest calculation, makes a saving of \$150 a month in fuel, in addition to \$100 a month that has heretofore been expended for manufactured gas for illuminating purposes.

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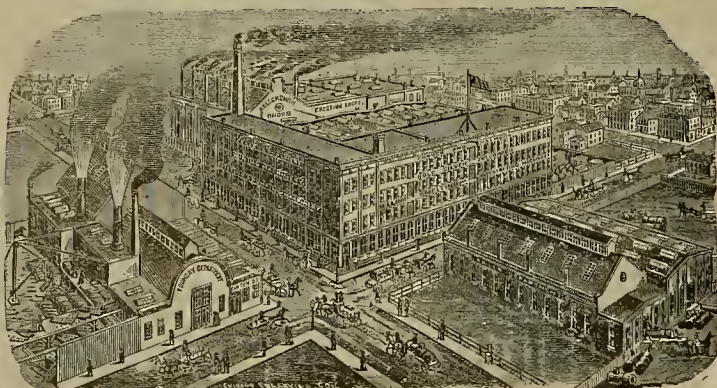
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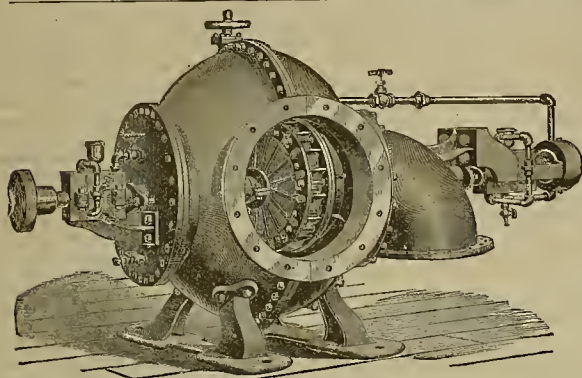
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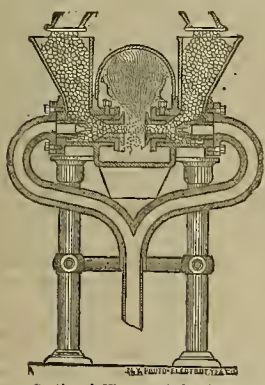
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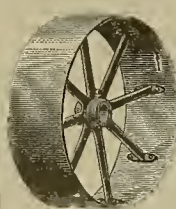
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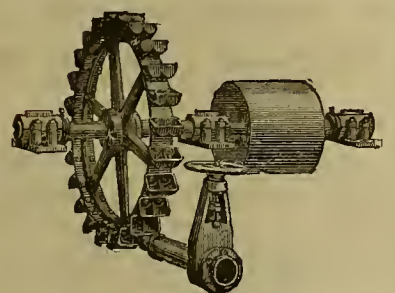
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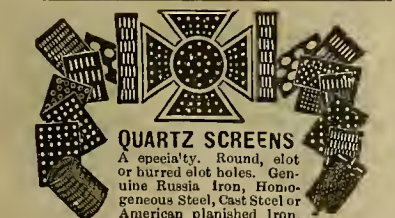
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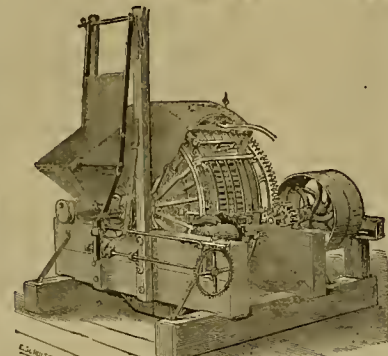
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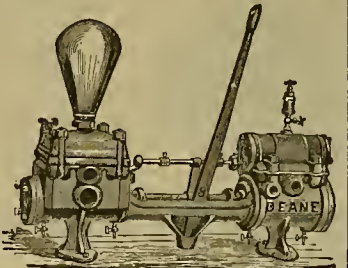
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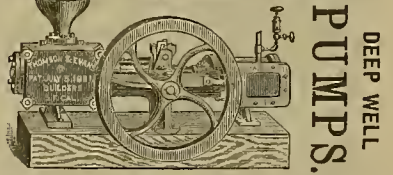
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 270 Market St., S. F.

FOR WEEK ENDING JUNE 26, 1888.

385,045.—SHOE TONGUE FASTENING—C. F. Crowell, Portland, Ogn.

385,101.—CAR COUPLING—W. M. Cutter, Marysville, Cal.

384,973.—CAN-OPENER, ETC.—E. Hawes, Sacramento, Cal.

385,314.—STATION INDICATOR—Benj. W. Lyon, S. F.

384,996.—TIME BALL—Chas. Muller, S. F.

385,133.—RIVET BURR REMOVER—E. H. Perkins, Visalia, Cal.

THREE TRADE MARKS—H. S. Crocker & Co. S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

STATION INDICATOR.—Benj. W. Lyon, S. F. No. 385,314, Dated June 26, 1888. This is one of that class of station indicators in which a ribbon bearing the names of the streets or stations is caused to travel periodically by means of power derived from contact of suitable mechanism with logs or obstructions in the road-bed; and the invention consists in a novel automatically operating pneumatic mechanism by which the power is transmitted to the indicator, and in a novel arrangement of the ribbon-driving mechanism within the box or casing. The object of the invention is to provide a simple and effective station indicator and advertising medium to be used upon steam and street cars and in other suitable places.

RIVET-BURR REMOVER.—Elijah H. Perkins, Visalia. No. 385,133, Dated June 26, 1888. The object of this implement is to remove the burrs of rivets so the rivets may be taken out. The invention consists in a hit having on its lower end cutters, said bit being mounted and adapted to rotate within a casing or stock, the lower end of which is provided with teeth for holding the stock stationary around the rivet hurr while the cutter within operates upon the hurr and cuts off the swaged portion of the rivet.

CAR COUPLING.—Wm. M. Cutter, Marysville. No. 385,101, Dated June 26, 1888. This device for automatically coupling cars consists in the combination with the car-humper and draw-head of a pin-holder and means for releasing the same at the instant when the cars come together, so as to allow the pin to drop into its proper position through the link of the car-coupler.

Mining Share Market.

Owing to the national holiday coming on Wednesday this year, the Stock Exchange adjourned from Saturday, June 30th to July 5th. Therefore no business of any moment has been done in mining stocks. Up on the Comstock the mine are yielding bullion in larger quantities than they have for years. The water is rather low in the Carson river. How it will hold out is a question. From all reports there is still much snow in the Sierras.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Moulton, June 27, \$14,000; Mt. Diablo, 30, \$8269; Cons. California and Virginia, 30, \$104,601; Confidence, 30, \$17,897; Savage, 30, \$26,350; Hale and Norcross, 30, \$140,000; Hanauer, 26, \$1900; Germania, 27, \$1479; Hanauer, 27, \$1380; Germania, 28, \$1360; Hanauer, 28, \$4500; Germania, 29, \$1488; Hanauer, 29, \$2100.

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Mr. J. S. Ewen, 123 California street, is the Pacific Coast agent of the American Railway Publishing Co., of New York and Chicago, and has furnished us with copies of the Street Railway Journal. He will be glad to receive any items of interest concerning railway matters, such as matter relating to novel appliances, extensions, new roads, etc. In connection with the papers he represents, Mr. Ewen has opened a purchasing agency for the convenience of interior patrons.

Mining Bureau Statistics.

Recent contributions to the museum of the California State Mining Bureau are as follows:

Silver ore, with native silver, Rialito Chihuahua, Mexico, from E. E. Cunningham.

Seateite, five polished specimens of various colors, Oposura, Sonora, Mexico, J. H. Crossman.

Gold on garnet and on epidote, Oaxaca mine, Idaho, J. C. Neslon.

Building stone, handsome carved column of seape "brownstone," from the Los Angeles Granite and Brownstone Co.

Gold quartz, rich in free gold and telluride of gold, Coos county, Or., A. H. Moore.

Gold in iron Jasper, Tuolumne Co., T. F. McArdle.

Petzite (telluride of gold), Sonora, Tuolumne Co., J. Z. Davis.

Gold quartz from the Calumet group of mines (six), Shasta Co., Almarin B. Paul.

Gold crystals on rhyacolite, Summitville, Colorado, J. B. Farish.

Telluride of gold, Boulder Co., Colorado, J. B. Farish.

Graphite in six-sided crystals, Colfax Co., New Mexico, J. B. Farish.

Gold on slickensides, Keystone mine, Amador Co., Cal., from the company.

Gold quartz, Arrow-weed District, San Bernardino Co., Cal., E. Wollch.

Silver ores from the Waterloo mine, Calaveras, Cal.

Section of iron water-pipe, completely filled with crystallized cinnabar, from the Sulphur Bank quicksilver mine, Lake Co., Cal., Melville Atwood.

Eighteen specimens of minerals from the Eastern States.

Gold and Silver ore, Mexico, E. Wollch.

Aragonite (onyx marbl.), Siskiyou Co., C. J. Smith.

Granite from new quarry at Mt. Raymond, Fresno Co. (said to be the best so far found in California), McLeellan & Co., and many others.

San Francisco Metal Market.

WHOLESALE. THURSDAY, July 5, 1888.

ANTIMONY—French Star	9 @ 91
BORAX—Refined	7 @ —
Powdered	7 @ —
Concentrated	6 @ —
COPPER—	
Bolt	26 @ —
Sheeting	26 @ —
Ingots	— @ 20
Fire Box Sheet	— @ 20
IRON—Cleveland 100	— @ 35
Eglinton, ton	— @ 27
American Soft, No. 1, ton	— @ 31
Oregon Pig, ton	21 @ 23
Key Brand White	— @ 23
Shot, No. 1	— @ 23
Bar 1 on (base price) 1 lb	21 @ —
LEAD—	
Pig	5 @ 6 12
Bar	5 @ 6 50
Sheet	5 @ 6
Pipe	7 @ —
Shot, discount 10% on 500 bag	Drop, 1 @ 60
Drop, 1 @ 60	2 @ 60
Chilled, do	16 @ 20
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	6 @ 8
Toe Calk	5 @ 7 20
TRIPLE—Coke	6 @ 7 20
Charcoal	6 @ 7 20
QUICKSILVER—By the flask	37 @ 38 50
Flasks, new	1 @ 50
Flasks, old	85 @ —

New York Metal Market.

Telegraphic advices dated July 5th give the following New York prices:

BAR SILVER—92 1/2 per oz.

BORAX—92

COPPER—LARS—\$16.65.

IRON—No. 1, \$32.00.

LEAD—\$4.02 1/2.

TIN—\$16.00.

The following is the latest by mail from the "New York Metal Exchange Market Report":

Copper—Steady, spot closing at \$16.50@17.00. Transferable Notices (100 lb) issue at \$16.50.

LEAD Firm, at \$3.92@3.92 1/2 spot. Transferable Notices issued at \$4.00.

TIN—Quiet at \$16.97@17.00.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @ Billiton Tin, @

Baltimores Copper, \$4.75@15.00; Orford Copper, \$15.50@17.75; P. S. G. Copper, @

Foreign Lead, \$4.60@; Foreign Spelter, \$5.00@5.10. Antimony, \$10.00@13.30.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labor of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

JOHN G. H. LAMPADARIO—Ventura Co.

G. W. INGALLS—Arizona Territory.

A. F. JEWETT—Tulare Co.

C. E. WILLIAMS—Yuba and Sutter Co.'s.

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ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta M Co.	Nevada, 37.	50.	May 12, June 18.	July 9.	W. H. Watson, 302 Montgomery St.
Best & Belcher Co.	Nevada, 40.	25.	June 13, July 10.	July 31.	L. O. O'Brien, 305 Montgomery St.
Bodie Tunnel M Co.	California, 15.	25.	June 5, July 9.	July 31.	C. O. Harvey, 303 California St.
Baltimore M Co.	Nevada, 2.	25.	June 30, Aug. 1.	Aug. 22.	W. W. Tenney, 402 Montgomery St.
Challenge Con M Co.	Nevada, 4.	50.	May 28, June 29.	July 18.	C. L. McCoy, 349 Pine St.
Champion M Co.	California, 30.	10.	May 11, June 16.	July 10.	T. W. 12, 322 Montgomery St.
California State Co.	California, 6.	10.	Apr. 18, May 24.	June 25.	J. O. Hanson, 10 California St.
Dianna G & S M Co.	Nevada, 7.	10.	June 5, July 10.	July 31.	J. W. Pew, 310 Pine St.
Eldred M Co.	California, 2.	01.	May 28, June 18.	July 30.	N. A. Eldred, 1533 California St.
Gould & Curry S M Co.	Nevada, 53.	50.	June 22, July 25.	Aug. 16.	A. K. Durbrow, 303 Montgomery St.
Live Oak Drift G M Co.	California, 9.	50.	June 13, July 17.	Aug. 6.	J. Morio, 323 Montgomery St.
Nye M Co.	Nevada, 1.	05.	May 24, July 8.	July 24.	W. J. Dorton, 40 California St.
Occidental Con M Co.	Nevada, 2.	20.	May 29, July 2.	July 25.	A. K. Durbrow, 309 Montgomery St.
Russell Reduction & M Co.	California, 2.	10.	June 6, July 9.	July 31.	J. Morio, 323 Montgomery St.
River King M Co.	Arizona, 1.	50.	June 22, July 30.	Aug. 23.	J. Nash, 323 Montgomery St.
Summit M Co.	California, 10.	10.	June 8, July 11.	July 31.	G. W. Session, 260 Montgomery St.
Seg Belcher & Aldrich Con M Co.	Nevada, 1.	25.	June 5, July 9.	July 30.	E. B. Holmes, 309 Montgomery St.
Southern Cal Coal & Clay Co.	Cal., 1.	10.	May 25, June 25.	July 26.	W. G. Mugan, 10 California St.
Scorpion M Co.	Nevada, 25.	10.	May 15, June 22.	July 10.	G. R. Spiney, 340 Pine St.
Western Mineral Co.	California, 2.	1.	June 21, July 30.	Aug. 20.	A. Chemerant, 323 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Bullion Beck & California M Co.	California, 3.	A. Badlam.	322 Montgomery St.	Annual, July 13
Benton Con M Co.	California, 1.	V. R. Allen.	330 Pine St.	Annual, July 27
Great Western M Co.	California, 9.	J. W. Pew.	310 Pine St.	Annual, July 27
North Belle Isle M Co.	Nevada, 1.	J. W. Pew.	310 Pine St.	Annual, July 27
Overman M Co.	Nevada, 6.	G. D. Edwards.	414 California St.	Annual, July 27
Spring Valley G M Co.	California, 1.	H. Michol.	320 Sansome St.	Annual, July 27
Savage M Co.	Nevada, 1.	J. M. Buffington.	303 California St.	Annual, July 19
Union Con M Co.	Nevada, 1.	J. M. Buffington.	303 California St.	Annual, July 19

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada, 1.	A. W. Havens.	309 Montgomery St.	50	June 11
California M Co.	California, 1.	H. R. P. Hutton.	306 Pine St.	25	June 12
Eureka Con M Co.	Nevada, 1.	J. W. Pew.	310 Pine St.	50	May 7
North Belle Isle M Co.	Nevada, 1.	J. W. Pew.	310 Pine St.	50	May 7
Hale & Norcross S M Co.	Nevada, 1.	J. F. Lightner.	309 Montgomery St.	50	May 7
Oregon Coal & Navigation Co.	Oregon, 1.	R. B. Adams.	211 Sansome St.	150	May 2
Pacific Lumber, Salt & Soda Co.	California, 1.	A. Glough.	430 Montgomery St.	100	June 11
Standard Con M Co.	California, 1.	J. W. Pew.	310 Pine St.	5	June 12

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 11.	WEEK ENDING June 12.	WEEK ENDING June 23.	WEEK ENDING July 5.
Alta	1.25	1.75	1.55	1.55
Best & Belcher	.75	1.00	1.55	1.60
Bodie	.95	1.25	1.25	1.40
Argenta	.35	.40	.50	.15
Belcher	3.15	4.40	1.50	4.50
Brophy	3.05	3.90	1.00	4.50
Best & Belcher	.90	1.30	1.25	1.50
Bullion	.65	.85	.90	.75
Baltimore	.55	.55	.55	.65
Bodie	2.00	2.25	2.30	2.40
Benton	3.00	4.00	3.35	4.00
Bodie Tunnel	.75	.75	.90	.85
Bullion	.85	1.10	1.10	1.00
Con. Va. & Cal.	3.05	4.75	4.50	4.60
Challenge	3.00	4.00	3.35	4.00
Chollar	3.00	4.00	3.35	4.00
Con. Imperial	.30	.45	.55	.55
Calcutta	.30	.45	.55	.55
Con. Pacific	.35	.40	.45	.45
Crown Point	.45	1.00	1.05	1.00
Crocker	.40	.45	.50	.50
Dudley	.40	.45	.50	.50
East E. & B.	.60	.60	.60	.60
Eureka	.80	1.20	1.20	1.25
Excelsior	1.85	2.05	1.85	2.30
Grand Prize	2.75	3.60	3.00	3.35
Gould & Curry	.65	.70	.75	.75
Hale & Norcross	.75	.85	.90	.80
Holmes	.15	.15	.15	.15
Independence	.75	.85	.90	.80
Iowa	.40	.50	.50	.40
Julia	.55	1.00	1.05	1.05
Justice	1.25	2.60	2.75	2.80
Lady Wash	.25	.40	.45	.50
Martin White	1.15	1.20	1.45	1.45
Mono	2.80	3.75	4.15	4.40
Mexican	1.20	1.50	1.75	1.95
Mt. Diablo	.30	.30	.30	.35
Northern Belle	1.70	1.60	1.80	2.15
Navajo	3.00	3.20	3.10	3.25
North Belle Isle	4.00	4.00	4.00	4.00
Nev. Queen	4.00	4.00	4.00	4.00
North G. & C.	.95	1.30	1.45	1.10
Occidental	.10	.10	.10	.10
Opbir	.10	.10	.10	.10
Potosi	2.50	3.40	3.45	3.70
Overman	1.95	2.35	2.25	2.40
Peerless	.60	.80	.70	.75
P. Sheridan	3.00	4.85	4.25	4.75
P. Silver Star	2.00	2.85	2.85	2.95
S. B. & M.	2.80	3.80	3.90	4.25
Sierra Nevada	.45	.60	.65	.65
Silver Hill	.40	.70	.65	.75
Silver King	.40	.70	.65	.75
Scorpion	.15	.15	.15	.15
Syndicate	2.70	3.60	3.90	4.00
Union Con.	1.10	1.40	1.50	1.50
Utah	3.60	4.60	4.80	5.00
Yellow Jacket	5.00	6.00	6.25	6.50

Sales at San Francisco Stock Exchange.

THURSDAY, July 5, 1888.	50	50	50	50
50 Argenta	1.50	50 Grand Prize	3.25	50
200 Alta	1.75	120 Hale & Nor.	7.25	50
200 Baltimore	1.50	120 Iowa	6.60	50
100 Belcher	4.45	150 Mexican	3.90	50
300 Bodie	3.90	200 Mono	3.90	50
200 Bodie	2.50	470 N. Belle Isle	3.95	50
150 Bullion	8.50	190 Nev. Queen	4.50	50
170 Challenge	5.25	100 Occidental Con.	1.25	50
50 Chollar	3.90	200 Peerless	2.05	50
100 Con Va. & Cal.	1.10	300 Savage	4.10	50
200 Crown Point	4.60	150 S. B. & M.	2.80	50
200 Con Imperial	5.90	100 Sierra Nevada	3.75	50
50 Confidence	2.25	250 Utah	1.35	50
500 Crocker	1.05	20 Yellow Jacket	4.95	50

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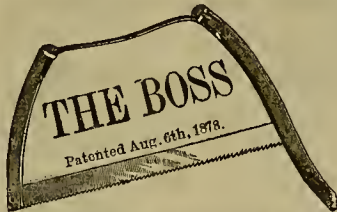
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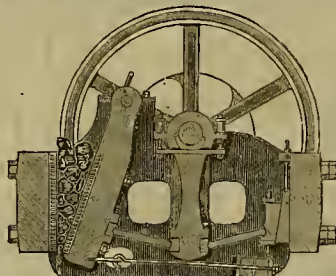
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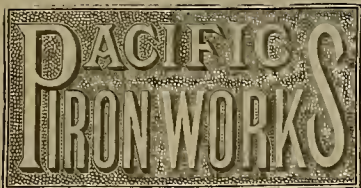
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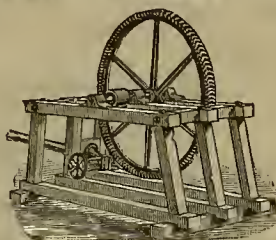
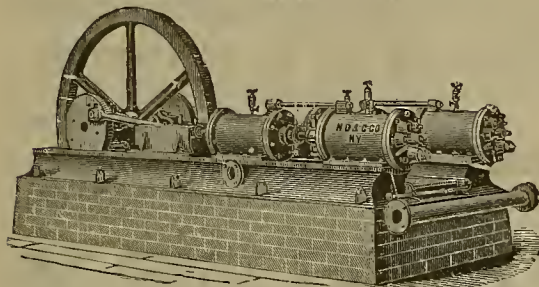
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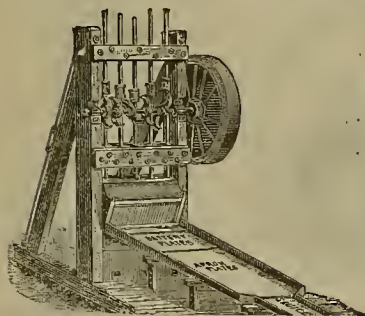


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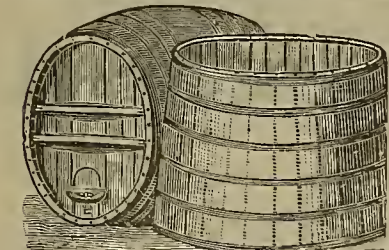
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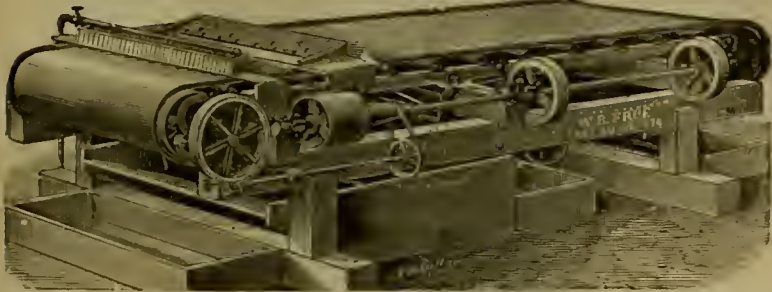
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THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

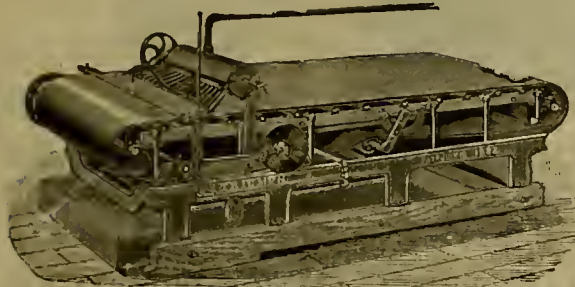
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Protected by patents May 4, 1869; December 22, 1874; September 2, 1870; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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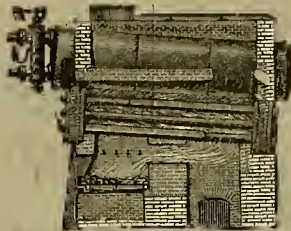
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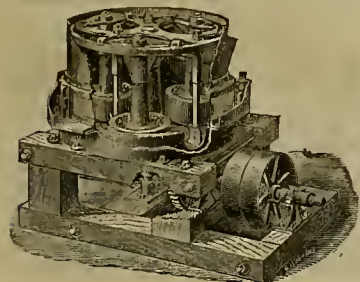
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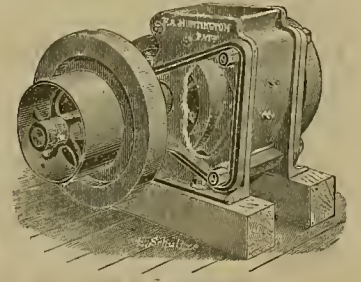


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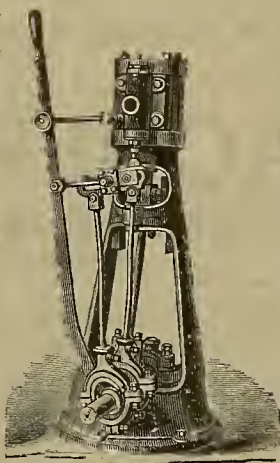
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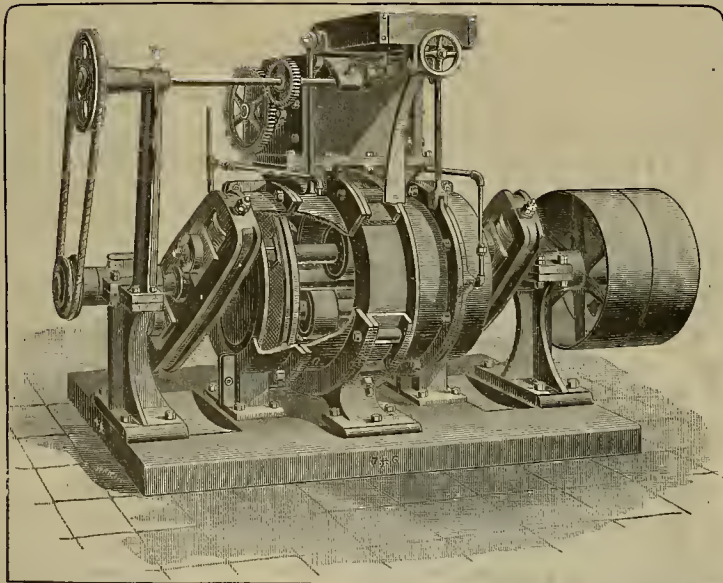
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This Mill, with a weight of less than 9000 pounds,
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two and a half to three tons per hour
of hard quartz to 40 mesh.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

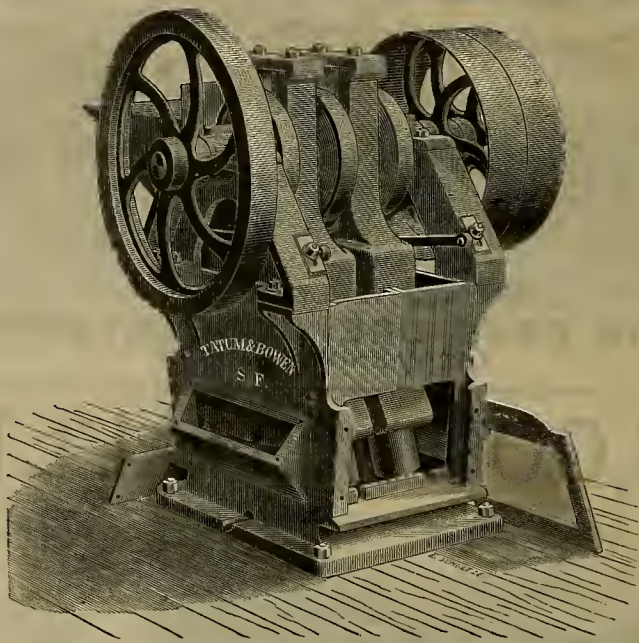
And renewals will not cost over one-half as much as for stamps. The attention of parties hav-
ing Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh.

OUR DRY MILLS are the most economical ever built, and are extensively used with
record of several years. No gridding in pans. Mill finishes to any fineness desired.

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We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp
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that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in
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The Mortar has screes at both ends, giving ample discharge. There are no cams or tap-
pets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

Several Mills are now in the mines doing excellent work. The "Economic" is not only a
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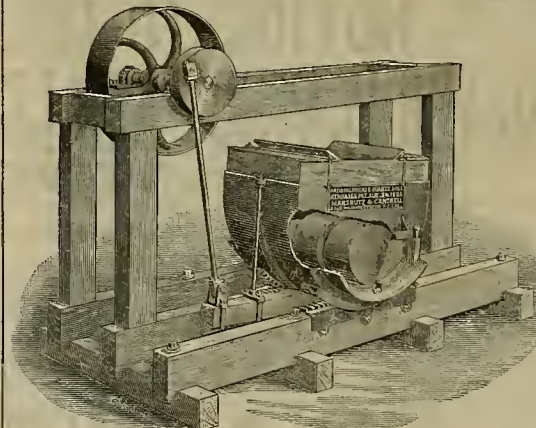
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KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



The Patentee and Manufacturers
cordially invite miners to critically
examine and pass judgment upon
this improved system of milling
and amalgamating ores in the fol-
lowing particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mills is less than one-half of stamps.
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4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machines in use.
8. In its simplicity of construction.

We challenge competition with
Stamps, Ball Pulverizers or
other ore crushing machines now
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Are you going to make any change in machinery? Are you freighting by team or packing on
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They are the Lightest, Strongest, Best Balanced and Most
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, JULY 14, 1888.

VOLUME LVI.
Number 2.

Deep-Creek and River-Bed Mining.

There are in this State and elsewhere many deposits of auriferous gravel in deep creeks and river-beds. Though known to be rich, they were too deep and wet to be worked in the early days of California mining, and in many instances they are now covered up deeper by the gulches, ravines and creeks having been worked out and the debris dumped in and on the beds of the large streams. The miners often knew them to be richer than many small streams which they were working, but the extra labor of deep "stripping" by hand-work was against them and there was more profit in working shallower though poorer diggings, less capital also being required.

Some years since J. P. Lamhing, a man who had conducted mining operations for the past 36 years in almost every way that gold is mined, turned his attention to this subject. Knowing of the existence of extensive and rich but deep deposits of gravel in creek and river-beds, he started in to devise suitable steam machinery to enable him to handle the earth or "strippings" overlying the pay gravel more economically and expeditiously than by the old method in practice in ordinary placer mining. It was also necessary to handle the large flow of seepage water usually met with in deep river-beds. After expending a large amount of labor and money experimenting for some five years, he has now at work the most complete plant to be found in the country.

The mine is called the Arroyo Seco, and is in Amador county, in this State. The machinery was made by Knight & Co. of Sutter Creek. It may be stated, by the way, that the system may be applied in some places where hydraulic mining is not allowed, enabling the miner to hoist his debris away from the tail of the flume, swing it away 220 feet, and pile it up, allowing the water only to pass down the stream.

Mr. Lamhing uses two large steam derricks for stripping off the deep deposit of barren surface sand, gravel and loam. These derricks are shown in the engraving. The derrick car is 56 feet long, 16 feet wide and 18 feet high. It is strongly built, covered with corrugated iron and weighs about 75 tons with the engines, boilers and machinery. The mast at the front end is 56 feet high, and boom 110 feet long, the outer end elevated 56 feet above the ground.

There is a self-filling bucket or dredger attached to a steel-wire rope (as will be seen by cut) at one end, the other passing up over a shear in the end of the boom and thence down on the topside of the boom to the machinery in

the derrick car. One man stands in the lever-house, near the top of the mast, 50 feet above ground, where he has a full view of everything around, and by the use of levers, with suitable attachments to the machinery below, he has perfect control, and handles all the machinery with ease and accuracy. The out shows one bucket on each derrick, one open and the other shut. The buckets are opened and closed by steam or compressed air. The power exerted in closing is 31,000 pounds, if necessary, in hard ground. When the bucket is opened and on the ground, the man in the lever-house, near the top of the mast, turns on steam or air to

and each succeeding pit is so dumped. The sluices are usually two to four strings, being set on the pay gravel in the pit, on the proper grade, and the necessary water brought from the surface to do the washing. After passing through the sluices, it passes with the seepage water through culverts underground to the pump-house, 200 to 400 yards distant, where it is raised to the surface 36 feet high by powerful centrifugal pumps, built especially for handling very muddy water and even sand and gravel. The water, or so much of it as may be required, is then returned to the sluices, where it is again used for washing. This, however, is

What is a Mine?

As defined by the lexicographer and the scientist, a mine is a subterranean work or excavation which has for its object the discovery and extraction of metallic ores or other mineral substance. But in addition to the underground works which constitute the mine proper, the term in its general acceptation includes also the ground itself, together with the plant, whatever the kind, such as hoisting, pumping, and reduction works; buildings for the accommodation of workmen, coal-hunkers, etc. According to this definition a simple

mineral claim or location on which no deep or underground work has been done would not constitute a mine, notwithstanding the custom that obtains to the contrary. Throughout our mineral regions every such claim, even though no work has been done upon it, is called a mine.

Even in common usage it seems to us that the distinction above taken ought to be observed, since to designate a wholly undeveloped mineral lode or other deposit a mine is to misrepresent and mislead. Such claim is wanting in the first and most essential feature of a mine, the underground work prosecuted for the discovery and extraction of ore or other mineral product. We might with as much propriety call a pre-emption or a homestead claim a farm as to call such a mineral claim a mine. It was shown in



MINING DREDGERS AT THE ARROYO SECO MINE, NEAR IONE, AMADOR COUNTY, CAL.

close it, and hoists it up. He then swings it around to any place within a circle of 220 feet, drops the load of from $1\frac{1}{2}$ to 2 cubic yards, swings the bucket back, lets it down on the ground open, all in from one to two minutes, according to distance to be moved. The derricks are capable of hoisting a load of 10 tons 50 feet high. They are placed on a solidly built railway track, which is taken up in front and moved to the rear as the excavating progresses.

Three men are required to operate one derrick—one leverman, one fireman and one track-layer. After excavating to the depth of 27 to 30 feet at the Arroyo Seco mine, they reach the pay gravel. It is from four to nine feet deep, the surface of it paying a few cents per pan, and getting richer as they go toward bedrock, where it often pays as many dollars per pan. When they first open the mine in the spring, if the pits or excavations have been filled up by the winter floods, they strip off a pit say 60 to 80 feet square, and hoist the pay gravel out on the surface, where they wash it in sluices while the stripping goes on. The next pit so uncovered is washed in the pit and dumped where the first pit was worked out,

only done when water is scarce, which happened last fall. But a small stream of water is necessary when handled in this way, the heavy sediment settling, while passing to the pump-house and returning to the sluices again. Mr. J. P. Lamhing, the superintendent of the Arroyo Seco Mining Co., who furnishes us the above information concerning the process described, has had many inquiries about the system of working adopted, and this description will interest many miners who have ground of a similar character.

A SUIT has been begun against the North Bloomfield Gravel Mining Company, asking that defendant be enjoined from dumping debris into the Yuba river, and also from selling water for mining purposes. The action was instituted by the United States, represented by Attorney-General Hart. This is the first time a suit has been brought in this way.

THE Oregon Iron and Steel Co. at Oswego has 300 men at work. The new furnaces will be ready for use by August. New hunkers for ore are being built. The company will work on a larger scale than ever before.

these columns not long since that as many as 30,000 mining claims had, first and last, been taken up and recorded in the State of Nevada, with presumably six or eight times as many in the other Pacific States and Territories—say 250,000 all told. Under the usage that prevails, all of these claims, or at least as many of them as have been kept good, are spoken of as mines, which not even five per cent of them really are.

This loose sort of phraseology came into vogue during the earlier stages of mining in California, when digging up the auriferous gravel with a pick and washing it in a rocker was termed mining, though hardly more like the real business than digging and housing potatoes. Gradually, as deep pits were opened on the river bars, and shafts were put down and tunnels run for reaching the drift or opening up the vein deposits, the business began to take on the proportions and otherwise assume the characteristics of substantial mining.

Now that this industry has so changed, we should begin to speak of it with a little more discrimination as well as show better judgment in our classification of what belongs to it than we have been accustomed to do.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Dutch Flat and Vicinity.

EDITORS PRESS:—Perhaps it is safe to conclude that not one person out of a thousand of the present population of California has ever heard of the circumstances from which Dutch Flat took its name. Since my arrival a few days ago I have been regaled with numerous stories relating to the matter. They have varied so much that I am certain that all of them cannot be quite correct, so I am left to decide for myself which is most entitled to credence. Stripping the subject of all the romance with which it has been connected, I find that in the early fifties, an adventurous Dutchman, in search of gold, after wandering among the rugged canyons, spied a little flat, now the site of the town, and, Dutchman-like, squatted upon it and began to mine near by. The miners of other camps in the neighborhood at first referred to this digging as the flat where the Dutchman lived. In those busy times the miners were not long in hitting upon an apt abbreviation of titles, and, accordingly, this camp which so suddenly sprang up, was soon known as Dutch Flat.

The population of the town, once numbering thousands of busy, prosperous miners, has been reduced within the last few years to between 700 and 800 all told. The disastrous termination of the debris question, which a few years ago caused the operation of hydraulic mining to cease, has worked a great hardship upon the poor miner. Very many, whose fortunes seemed assured, if not already within their grasp, found themselves, on the enforcement of the Anti-Debris Act not only "broke," but thousands of dollars worse than nothing. They had invested their all, and more, in the machinery and appliances necessary for the prosecution of their legitimate enterprise, which finally they were not allowed to continue. All they now possess is the empty satisfaction of knowing that within the soil they possess, granted them for mining purposes, there are thousands, and perhaps millions of dollars, which they dare not use profitable means to make available. Tell me, is it not a little hard to say that such a state of affairs is even-handed justice? While a full measure of sympathy is claimed for the hard-working and honest granger, it would seem highly fitting that at least a mite should be loaned to the poor but equally honest miner.

The country for miles and miles around Dutch Flat is strewn with the piping, once used in hydraulic, which is being gathered at the railroad depot to be shipped to the mining regions of Oregon, where thus far no kicking against the "slicens" is going on. The web-footer, unlike the tar head, seems to have enough to engage his attention without meddling in the affairs of his neighbors.

It will not do, however, to take too gloomy a view of the outlook for the mining interests of this region. There is ground for hope that mines of untold wealth will sooner or later be discovered in the vicinity, from the fact that at no time within the history of this part of the country has there been more skillful attention paid by a greater number of men to prospecting for quartz exclusively, nor have the labors of the prospector been devoid of encouragements. Reports from various directions are of a character to cheer up the drooping spirits of the inhabitants of this region. Near Gold Run, but a few miles west of here, the Everhart Bros. have discovered an eight-inch ledge, which tested, lowest ore, \$152; highest, \$300. It is situated in the secret town mining district. The test was made of rock at the depth of 74 feet, where the ledge was lost. They are now trying to get on the ledge with pay shaft. The main tunnel is now 490 feet. These same gentlemen lately sold Mr. J. A. Parker of Sacramento a ledge for \$900, which the latter is exploring. Eighty-five feet descent has been made already and prospects as well on the surface. This ledge averages 2½ feet.

It is hard for those who have long followed gold mining and become infatuated with the pursuit to give it up. It is next to impossible for the miner to see any satisfactory reward in but few other callings. Were this not the case much of his grievance, so far as this section is concerned, would, in due time, vanish. By actual experiment it has been made clear that for the production of some varieties of fruit, no section of famous California can excel this. The difficulty, so far, seems to be to get general interest on the subject duly awakened. To the credit of such men as Messrs. H. A. Frost, J. C. Chester, Chas. E. Kidd, Kinney and a few others I might name, who are directing scientific attention to the matter, and who have each offering promise in fruit production, it is no longer a question of producing the finest apples, pears and plums grown in the State, and perhaps unequalled anywhere in the United States. Some of these gentlemen can show last year's apples to-day apparently as sound and well preserved as on the first day of this year. The altitude and consequent temperature seems specially suited to the production of the varieties I have named. That this branch of industry must soon become prominent, if not paramount to every other, requires no great sagacity to foresee.

Then again there is wealth in the climate of this region, and the appreciation of it will increase as the knowledge of its excellence spreads out and reaches our less favored brethren of the Eastern States. When the senseless craze concerning Southern California climate shall have died out, as we have abundant reason to believe that it will shortly, and people become aware of the fact that California is not in Los Angeles, but simply the reverse, then, beyond doubt, the middle and northern sections of the State will receive their due share of attention, and the western foothills of the Sierras will be sought out and appreciated. And there is comfort in the assurance that this boom, which shall sweep over this portion, will not collapse with the season, but will be solid and enduring.

As regards the healthfulness of this region but little need be said. All know, or, at least, should know that mountain life and healthfulness are well nigh inseparably connected, especially in so far as reference is made to submountains as these. Numbers are beginning to find out that this is one of the places to come to pass a really pleasant spell. Reasonable hotel accommodations are furnished at Gold Run, where B. Moody of the National Hotel pays strict attention to his line of business. While at this place W. A. Sharon of the Dutch Flat house not only makes an effort to please his guests, but succeeds so well that guests are loth to depart. This gentleman takes an especial interest in making known the various attractions which the region possesses for tourist and others who lay over here. On my arrival Mr. Sharon alluded to some of the claims of this neighborhood upon the public as a resort. I told him that I was not aware that anything of special importance existed here to interest travellers. "That is just the reason why I mention it to you," he said, "comparatively few, if any, strangers are aware of what grand scenery is here; one view in particular that is to be seen within four miles of this place. I will take you to it to-morrow if you wish. It is off the line of the railroad is one reason, I suppose, that so few know of it." I assured him that it would be a means of much gratification to me to behold such a view as he gave me to understand it to be.

So on the following morning, after breakfast, we were not long in making ready for the trip. The team being in readiness, we soon mounted and found ourselves whirling along at a rapid speed behind spanking steeds part way over the old stage road and part way along the old emigrant grade, but for the most part along a road, if road it might be called, that had long been abandoned, and was now obstructed with caved banks and fallen trees; but withal it was a pleasant ride, which brought us to one of the highest eminences overlooking the American river that exists in the neighborhood. Alighting from our buggy and tying the horses in the shade of a pine tree, my escort led the way a few rods beyond, when suddenly there broke upon our vision a chasm of over 3000 feet in depth. The rock upon which we stood overhung almost perpendicular walls of granite. Through the bottom of perhaps 1000 acres flowed a stream apparently about 10 feet wide, but which I was assured was at least sixty. This proved to be the American river and the spot is known as Green Valley. At the edge of the river Mr. Sharon pointed out an upright stone which is called Pyramid Rock, 100 feet high, but from our position it had the appearance of less than ten. Miners' cabins, of which there are a number, were seemingly mere bird-nests, and adults presented the diminutive stature of infants. Looking to the eastward, Old Man Mountain, a prominent snow-capped peak of the Sierras, loomed skyward, while to the south and southwest Indiana Hill, Iowa Hill, Forest Hill and other old mining camps of lesser note were pointed out to my admiring gaze.

A little farther to my right in dimmer distance I could behold the great Sacramento valley spread out and presenting in the glimmering sunbeams the appearance of a vast inland sea. For more than an hour I was an attentive listener to a narrative of the scenes and experiences of early mining days, as given by one who had participated in person. "Do you see that rattle in the stream just below Pyramid Rock?" said Mr. Sharon. "That is where Waterloo claim was located. It was not thought to be valuable at one time and was sold to Chinamen for \$400. Within three months they cleaned up \$125,000 from it. A short distance above, where you see that cluster of cabins, is Hidden Hill. At this place was located the famous Golden Ring claim. It was among the richest claims of the American river diggings. I would not venture to say how many millions of dollars were taken out of it." My companion then related the Indian legend connected with the rock on which we were sitting. As the story runs, it appears that in the long, long ago, before the intrusion of the paleface, there dwelt in Green Valley a tribe of natives to which belonged a certain Indian maiden whom the chief's son longed as his wife. But the damsel would otherwise. An imperative injunction was finally issued by those in authority over her to the effect that she must yield to the ardent wish of her royal lover. Finding entreaty on her part unavailing, one evening, as the sun was hiding his face behind the lofty mountain-tops, this courageous daughter of the woods climbed to this point and cast herself down the precipice. From this circumstance it is since aptly termed by the whites, "Lovers' Leap." F. B. L.

Dams for Mining Debris.

The Operations at North Bloomfield.

EDITORS PRESS:—Silt has been commenced by the U. S. against the North Bloomfield Gravel Mine. The injunction of this mine as an open hydraulic some five years ago, is an old story, but for some time past operations have been carried on under great disadvantages on the plan of impounding the debris. Of course the work has been very much crippled under this limitation, but the company has managed to do a profitable business. Now it seems that even this resource must be cut off, and the once famous mine will be added to the long list of non-producers.

I have just visited this mine. The manner of working, as many of your readers know, is to elevate the tailings from the monitors to a height of 90 feet, by means of the hydraulic elevator. They use 675 inches of water under a pressure of from 350 to 530 feet for piping, and 1400 inches under 530 feet in the elevator. All of this water and all of the tailings pass to a reservoir 2500 feet long, formed by a dam across a portion of the worked out hydraulic ground. The dam is 20 feet thick, stands at an angle of about 66 degrees, and is made of small pine trees laid across its length, and gravel.

The present height of the dam is 40 feet, but it was not built to this height in the first place, but gradually, as required. This is a feature of debris dams which seems to have escaped the attention of some, including the judges of Supreme Courts, who have expressed opinions as to the feasibility of impounding tailings on a large scale. A debris dam need never be exposed to a very considerable pressure of water, being built only to a very moderate height at first, and gradually raised as the bottom under the water is raised by accumulation of the impounded material. In this particular case the dam is absolutely safe because it is at the upstream end of the reservoir, and the inlet is so near to it, or at least one inlet is, that the coarse gravel, not the slickens, is that which remains banked against it, and in fact, at this writing, there is a strip of dry, solid land, 100 feet wide, adjoining and forming a part of the dam. The angle of stability of such material is not greatly less than the slope of the dam, and the gravel soon becomes in a measure cemented by the infiltration of sand and ferruginous water. No large stream of water can ever flow from the reservoir over this dam to cut it, because the flow is the other way, and if the brush of which the dam is made (pine trees) should rot in course of time, and it would scarcely do so during the life of the mine, the gravel would by that time have acquired, if it does not now possess, stability independent of the dam. And if the dam could break to-morrow, and all the contents of the vast reservoir could run out, which they could not, the only result would be that the mine would be to that extent refilled by its original material.

The present outlet of the reservoir, through which flows the dirty water and a little suspended slickens, is at a point about 1500 feet distant from the inlet and from the dam. This outlet consists of a cribbed and planked shaft connecting with the mouth of the old drain or tailings tunnel of the mine, which tunnel, by the way, cost the company half a million dollars. This shaft is built up *pari passu* with the dam, in proportion as the reservoir fills with debris, and so as to maintain such a depth of water constantly as to insure the settling of all but a small percentage of solid matter.

A new outlet 2300 feet from the inlet is now in process of construction by means of an inclined tunnel or drift on an angle of 20 degrees to connect with the drain tunnel. This drift will be 615 feet long, of which about 100 feet is now completed. At the mouth of the drift another box-shaft will be built up as required to retain the tailings. The drain tunnel delivers the muddy water into the South Yuba river.

Whether it is that the water escaping from this reservoir still carries suspended a sufficient quantity of silt to be appreciable injurious to the rivers and valleys, or whether it is that the company is in contempt of court by working in any way, I do not know. The case seems a hard one, and it is just such cases as this that are taking the breath and the courage from the miners, many of whom are convinced that even drift mining is doomed and quartz will sooner or later come under the ban; and why not? The same string runs through all, and that string sounds ever the same note, varying only the octave.

I have read the article of your correspondent, L, who has taken the word out of my mouth, and your editorial remarks on judicial decisions, in regard to which I plead guilty of being "in contempt" too profound for utterance, or at least for printing. I know of a case near Colfax, an injunction by a supreme (God save the mark) judge, whose charge to a jury some years ago moved my deep disrespect. It is not that I have any direct personal interest in mines. I should not care if every mine in California were closed to-morrow, on my own account; and I concede, and the miners with whom I have conversed concede, that the rights of the farmers and other valley dwellers should be considered; but I have no patience with the judicial stupidity which cannot see the difference between a debris dam and a water dam, and which permits the latter, which is dangerous in spite of all precaution, while prohibiting the former, which,

with ordinary prudence is absolutely safe. I fancy that perhaps the judge may have lost money in mines in the past.

These considerations, including those presented by yourselves, and some others, recall the often asked but seldom answered question, "what are we coming to?" And I fancy the answer to be, to unbearable tyranny of officials and monopolists first, and to disruption of this great commonwealth, or to imperialism at last. Americans boast of their country as the land of freedom, *par excellence*, but California is not near so free as any one of the Australian colonies, less would the Chinese question have been settled long ago, and this debris matter would, as it could, be arranged speedily and justly.

C. H. AARON.
North Bloomfield, Nev. Co., July, 1888.

Ores for Leaching in Mexico.

EDITORS PRESS:—Having read the interesting articles of C. A. Schenk on the leaching process, published some months since in your valuable paper. I asked him lately if he knew parties that would take a controlling interest in large deposits of crushed ore fit for lixiviation, and he refers me to you as in a position probably to bring me in contact with moneyed men, who might be interested in this subject. Thus, I beg leave to trouble you in a matter which may interest some of your friends. The facts are simply these: From a bonanza lasting over 45 years and producing weekly 2500 tons of ore, crushed hastily and run through the patio as quick as possible, there is a vast amount of tailings, and these tailings assay about 8 to 10 ounces per ton. I would say the actual test runs yielded 12 ounces per ton of silver and some little gold. The location is near a town of 7000 inhabitants, three miles from a Mexican Central R. R. station, in a cool climate excellent for health; by cold, I mean tableland, with fresh temperature and practically no winter. Coal will there now soon be delivered at \$10 a ton, while fuel is a little more expensive, and salt costs \$7 a ton. For 20,000 tons of selected ore of 10 to 12 ounces, one-third interest is retained and a royalty of \$2 per ton has to be paid. In exchange, a hacienda is offered with water supply for use of the new plant, which would be paid by the surplus value of this ore and more, because half the quantity of ore would be sufficient for it. After amortization of all expense the controlling interest of a little over half would be to the owners of the plant and hacienda, and thus a running or continuous profit without expense secured.

I know of quite considerable deposits of ore fit for leaching and claimed to run 50 ounces per ton, but some distance off the railroad, though in a part where wood and timber is very cheap, and all quiet and safe. The examination of both these ores on the ground is so easy, and test runs could be so cheaply made, that the calculation of profits to be secured should be reliable.

For amalgamation I control 75,000 tons of rather free-milling ore, which leaves \$8 per ton for treatment, while the same ore tested at Luckhardt's in San Francisco has been calculated to cost from \$1.15 to \$1.20 per ton. Even supposing fuel double in price here, yet profits would be considerable and only a "Boss" plant wanted. A 40-stamp mill is idle here, for which I could get all the ore it could treat at good profits.

GUANAJUATO, MEXICO.

Tin Plate Manufacture.

EDITORS PRESS:—A local journal has copy of an article recently published by you recounting operations which have been taken in connection with the working and development of tin mines in your State, also stating that tin plate had been satisfactorily produced with tin made from the output of these mines; and, further, that it was contemplated to proceed with this industry for the supply of tin plate to the western portion of the continent.

I have not a knowledge of any of the parties interested in the movement, and would therefore ask the favor of your inserting this letter in your journal, so that in attracting their attention it may possibly lead to opening up the subject of tin plate manufacture with myself. Meanwhile let me state that I am a practical tin-plate maker from South Wales, England, now engaged in this country in advocating its manufacture, and know my contributions to the Eastern press are known and recognized as an authority upon the subject.

I am interested in patented appliances in general use at tin-plate works for reducing cost of production, and am therefore in the most favorable position to undertake the making of tin plate under the most advantageous conditions. Trusting this letter may elicit a reply from those connected with the movement, I am yours faithfully.

WILKINS FRICK.
1212 Michigan Avenue, Chicago, Ill.

THE TECHNICAL SOCIETY of the Pacific Coast, which has not published any of its proceedings for some months, has a number of papers in the hands of the printer, and the regular "transaction" will soon be ready for distribution.

MANY teachers have already arrived from the East to attend the National Educational Association.

A LARGE portion of Flagstaff, Arizona, was destroyed by fire lately.

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SAN FRANCISCO

Saturday Morning, July 14, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Deep Creek and River Bed Mining; What is a Mine, 21. Passing Events; Drift Mining; The Stewart Mining Bill; The Russell Process, 24. Electric Motors, 25.

ILLUSTRATIONS.—Mining Dredgers at the Arroyo Seco Mine, near Ione, Amador County, 21. Keith's Constant Current Electric Motor, 25.

CORRESPONDENCE.—Dutch Flat and Vicinity; Dams for Mining Debris; Ores for Leaching in Mexico; Tin Plate Manufacture, 22. Tuolumne County Mines; The Russell Process; Kern County Mines, 23.

MECHANICAL PROGRESS.—The Literature of Different Irons; A New Tube-Making Process; New Process for Wire Manufacture; The Sand Blast for Cleaning Walls; Oerman Imitators; Steel for Smith's Use; Phenomenal Wire Drawing; Corrugated Iron for Dwelling Houses; To Determine Manganese Steel, 26.

SCIENTIFIC PROGRESS.—Contradicting Mr. Darwin; Feeding the Flames; Prize Studies of Tornadoes; Velocity of the Sound of Fire Arms; Resolving Hydrogen, Oxygen, etc., into their Elements; Electricity in Probing; Platinum in the Sun's Atmosphere; Contracting Effect of Alcohol; Diamonds in a Meteorite; Silencing Iron; A Cement for Stopping Cracks in Sinks, 26.

USEFUL INFORMATION.—Chinese Carpenters; The Ivory Trade is Dead; Soldering Holes; Steel Tired Wheel; Oil from Indian Corn; A Mailing Case for Liquids; Capacity of Pump; Brass Alloy, 27.

GOOD HEALTH.—Shun Worry and Excitement; Bee Stings; Faith Cures; Curious Case of Deafness; House Draining, 27.

ENGINEERING NOTES.—Windmills as Sources of Power; Electrical Transmission of Power; Locomotives and Canals, 27.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 28-30.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 32.

Business Announcements.

[NEW THIS ISSUE.]

Electric Power—N. S. Keith.
Sampling Works—Gillette & Childs.
Hydraulic Giant—Joshua Hendy Machine Works.
Air Compressors—Rand Drill Co., New York.
Pumps—Dow Steam Pump Works.

See Advertising Columns.

Passing Events.

The Cracker Creek mines, in Oregon, are just now attracting great attention. Some heavy sales have been made. The new mining town of Cleveland is at the junction of Silver and Cracker creek, and prospectors are arriving there from all directions.

The first dividend of the North Star Co., Grass Valley, Nevada county, this State, is announced. It amounts to \$50,000. This mine is taking out ore from the depth of 1600 feet on the incline, and the famous Idaho, which has been a regular dividend-payer for 19 years, is getting its ore at a depth as low as 2200 feet. This looks well for gold ore as "going down."

At last, after patient waiting, the Black Hill people, Dakota, are to have their leaching works, the brick and lumber for the plant having been purchased. Exhaustive experiments have already been made with the ores, and the leaching process decided on as the best by which to work them.

It is not probable that Stewart's Mining bill will be acted on by Congress this session, and miners can go on as usual without change of law for the present.

The quartz-mining industry in this State was

never in a more prosperous condition. Reports received indicate increasing interest in this branch of mining in California.

The silver-mining craze in Australia brought on a mining-stock speculative boom which the PRESS predicted would have a bad result. Late news from there states that many Australian investors have been financially ruined.

Drift Mining.

This business, pursued in California from an early day, continues one of the most active and profitable branches of gold mining in the State. Though confined mostly to the central mining counties, gold extraction by the drift method is carried on over a wide area, the Pliocene channels or "Dead rivers" constituting the sites of its most extensive operations. For reaching the deposits deeply buried in these old riverbeds, recourse is had to shafts and tunnels, from which the work of their further exploitation is carried on. When shafts are employed for the above purpose, the auriferous gravel is raised to the surface in large buckets operated usually by windlass or horse-power. Where tunnels are in use the material is brought out on cars run over tramways.

The following constitute the most notable drift localities in California: Vicinity of Forest City and Slate Creek, Sierra county, where some of the tunnels driven exceed a mile in length; along Little and Big Butte creeks and about Magalia, Butte county, most of the mines along these creeks being small but very productive. At Magalia also a few of the claims paid enormously. Of all the drift districts in the State the mines on the Forest Hill divide, Placer county, have yielded the most steadily and in the aggregate perhaps the most largely. The closing of the hydraulic mines has tended to late to give additional importance to drift mining by diverting to the latter much of the capital and labor formerly employed in hydraulic operations.

The Stewart Mining Bill.

As before stated in the PRESS, there is little probability of the amendments to the mining laws proposed by Senator Stewart of Nevada passing Congress this session. As, however, the amendments provide that the period within which annual work must be commenced on the 1st day of August instead of the 1st day of January, as heretofore, many miners have been anxious to learn the fate of the bill. We wrote some time since to Senator Stewart for the exact status of his bill, and this week received the following letter:

UNITED STATES SENATE,

WASHINGTON, June 30, 1888.

Editor "Mining and Scientific Press"—DEAR SIR:—On my return from Chicago I found your favor of the 8th inst. Inclosed I send you a copy of the mining bill introduced by me as it passed the Senate. It is still pending in the House Committee on Mines and Mining. I do not know what action the committee proposes to take on it during the present session. It may be amended in some particulars. I have received many letters from mining men suggesting amendments to the bill, and I may submit some of them to the House Committee. A suggestion in a letter I have just received from Eureka, Nevada, seems worthy of consideration. It is to the following effect: If the same person, corporation or association own several claims which combined do not exceed 1500 feet in length by 600 feet in width, the owner may make a relocation of the same and obtain a patent therefor in one application, provided adverse rights are not affected thereby.

I have not pressed the bill in any haste; there is no difficulty in passing it when perfected. My anxiety has been, and still is, to have the bill when passed remedy the defects which have been discovered by experience under existing laws. Any suggestions, therefore, in regard to the bill are very welcome. Yours truly,

WM. M. STEWART.

Lack of space prevents our printing the bill in full in this issue, but we will publish it in the next number of the PRESS.

The Consolidated California and Virginia mine on the Comstock produced \$405,834.08 in June from 13,030 tons of ore. The gold contained in this bullion was valued at \$197,935.29 and the silver at \$207,898.79, the proportions being unusually even. The average yield of the ore per ton in bullion was \$31.14, and the average assay value was \$36.92 per ton. Such a showing of any one mine in one month in a newer mining region would at once create a great boom. Yet many persons imagine the Comstock "played out."

The Russell Process.

With this issue, of the MINING AND SCIENTIFIC PRESS appears the first of a series of articles on the "Russell Process in Its Practical Application and Economic Results." As the subject will be continued through several numbers, it will be well to give here a short description of the process, and a summary of the remarkable results so far attained by it.

The chemicals used in the process are any form of copper soluble in a hyposulphite solution, an acid and a carbonate of an alkali—this term including, as in works on chemistry, both the mono-carbonate and bi-carbonate. Of the above chemicals the most important is the compound of copper from which is formed the cuprous hyposulphite generally known as the "extra solution." The object of the use of the copper compound is partly the neutralization of caustic impurities accumulating in the stock solution, but mainly the dissolving and removing of gold and silver compounds by the action on them of cuprous hyposulphite. Whether the copper compound is added to the ore during the leaching with a hyposulphite solution or before, in some other solution, is immaterial. In the former case a compound of copper soluble in hyposulphite solution is dissolved in it and the resulting compound solution allowed to pass through the ore. In the latter case a copper compound in an aqueous or any other solution is introduced into the ore before the use of the hyposulphite solution. From this solution the copper is precipitated in the ore by carbonates or other compounds existing naturally in the ore or mixed with it. The redissolving of the precipitated copper by the hyposulphite solution subsequently used forms the "extra solution" in the ore. The use of the acid is for the purpose of destroying caustic alkali in the leaching solution. It is not required in the treatment of raw ore, and seldom in the treatment of roasted ore, as the "extra solution" also acts as a neutralizer of caustic impurities. As the solution dissolves no more lime from ores containing 50 per cent than from those having one-half of one per cent, the amount of acid required is independent of the lime contents of the ore. The soluble carbonate may be used: First, for the purpose of removing impurities other than caustic alkali from the solution; or for precipitating the lead in the ore. Second, for precipitating the lead by itself from the solution containing the precious metals and lead. In the first case the carbonate is added to the solution before using upon the ore, and in the second case to the solution already used.

Application of the Process.

Mechanically in its ability to treat the finest and coarsest material, as well as chemically, the process has a wide applicability. Except in one case, that of raw slaty tailings from ore crushed originally for amalgamation and through a 50-mesh screen, no difficulty has been experienced in the mechanical treatment of any material. In the case referred to, the ore was ground in the amalgamating pans, and subsequently, before being subjected to the leaching process, re-treated and again ground in the pans. Even in this case of extremely fine material the drying of the tailings at a low red heat removed the difficulty entirely. In the treatment of well-roasted material there can be no mechanical difficulties even in the case of the finest material. Well-roasted fine dust from the dust-chambers of a Stetefeldt furnace of such a fineness that 90 per cent passes a screen of 150 meshes per running inch, leaches as rapidly, owing to its light condition, as the coarsest material from the "chaff." On the other hand, ore crushed by rolls through an 8-mesh screen, yielded 92 per cent by leaching. Chemically speaking, the applicability of the process seems to have no limit. Partial analyses of some of the ores so far treated are given in the following table:

	PbS	ZnS	FeS ₂	PbCO ₃	CaCO ₃	MgCO ₃	Cu
Sombrerete.....	25%	8%	20%	....	....	....	1.5
".....	15	10	50	....	....	....	2.0
".....	10	8	25	....	....	....	1.4
*Yedras.....	19	82	37.2	....	33%	....	0.0
Cashimiriachic.....	7.6	11.9	5	....	....	....	0.4
Ontario.....	11	13	8	1%	....	....	0.3
".....	2	0.5	0.5	2	....	....	0.2
Marac.....	3	Trace	Trace	5	1.5	....	0.6
Lake Valley.....	2	0	0	....	4	....	0.0
".....	3	0	0	....	5	2	0.0

*Yedras ore also contained 9.3% of arsenic.

In some of the ores so far treated the percentages of various elements met with have risen as high as 4 per cent copper, 20 per cent arsenic, 18 per cent zinc, 25 per cent lead, 35

per cent lime and 30 per cent iron (as pyrites). Concentrates containing 80 per cent of iron, lead, zinc and copper sulphides yielded 90 per cent after roasting. From the experience thus far this amount or form of occurrence of the base metals in an ore seems to make no appreciable difference with the results by the process. The values of the materials so far treated vary from 8 ounces tailings to 14 ounces raw ore, and from 12 ounces to 100 ounces roasted ore. For roasted ores containing lime, the expense of treatment are usually less than for those that contain none. In all cases the amount of salt required for roasting is less than for either the ordinary leaching process or amalgamation. The presence of arsenic or antimony in an ore seems to make the use of salt practically unnecessary when the Russell process is used. Requiring only one-fifth as much water for roasted ore, and about one-thirtieth as much for raw ore, as amalgamation, the great applicability of the process to dry regions is apparent. A very wide application of the process will probably be in the raw treatment of ores, but a still wider application in connection with concentration in the treatment of low-grade raw ores containing lead. The small cost of the plant required, the high extraction of the silver and saving of the lead by the two processes, combined with the low cost of treatment—from \$2 to \$3 per ton—opens up a very promising field.

The Plant.

The plant required for this process, needing no machinery, is entirely independent and complete in itself, and may be situated wherever convenient, without reference to the position of the crushing plant for raw ores, or the crushing and chloridizing plant for ores requiring roasting, except as regards the easy transportation of the raw or roasted ore between the two plants. Consequently, when either of the two above-mentioned plants for the preparation of the ore already exists in connection with amalgamation or concentration, the change to the Russell process alone, or to this process in connection with concentration, can be made without stopping or interfering with the above plants. The estimated total cost of a 35-ton leaching plant now being constructed as an addition to the Marsac mill at Park City, Utah, is \$3500, including grading, foundation, building, tanks, apparatus, etc., up to the shipment of the product. The cost of a plant of the same capacity for the treatment of raw ores would be about \$2500. The erection of a plant for the Russell process, in connection with the crushing or the crushing-chloridizing plant of many amalgamating-mills and leaching-mills would result in a doubling of the crushing and roasting capacity, in addition to the less expense of treatment and higher results obtainable. The cost of treatment by the Russell process, including the preparation of the ore, varies from \$1.25 for raw tailings to \$3 for raw ore (including crushing). The cost of crushing, chloridizing, leaching, etc., varies from \$4 to \$5.50.

We commend the above figures particularly to the mine-owners of Leadville and Aspen, Colorado. At the former place dry ores containing 15 to 18 ounces are thrown over the dump. On ores from Aspen the smelter's returns are based on 95 per cent of the ore value, with freight and smelting charges varying from \$20 to \$25. At that place 15 ounces ore is thrown over the dump, 15 to 30 ounces ore is left untouched, and only such ore as assays over 30 ounces can be disposed of. The total expenses connected with the shipping and disposal of the product from the Russell process, including the difference between the New York price of silver and gold and the price actually obtained, amount to 2½ to 3 per cent of the value of the ore treated. At the Ontario the corresponding expenses on bullion from amalgamation are 2½ per cent of the ore value. If we here take into account the less price paid for gold in the product from amalgamation as compared with that of the Russell process, the expense amounts to 3½ per cent of the ore value.

Comparative Tests.

As to the superiority of the Russell process over the ordinary leaching process and amalgamation, both as to expenses and results, the statistics given are most convincing. Six comparative runs between this process and the ordinary leaching process have so far been made in the various mills in which the process has been introduced. These runs each cover a

period ranging from two months to two years, end in each, except that at the Ontario, the number of tons treated per day varies from 25 to 70.

At the Ontario, in the two-ton experimental plant erected for the purpose of testing the Russell process and comparing it with amalgamation and the ordinary leaching process both as to expenses and results, and in which the comparative tests were continued for over two years, the extraction by the Russell process on chloridized ore exceeded that by the ordinary leaching process to the extent of 26.2 per cent of the value of the ore, or 22 6 ounces per ton. On ore roasted without salt the extraction by the ordinary process was only 35 per cent, and by the Russell process 85 per cent, a difference of about 35 ounces per ton.

The second competitive test between the two processes occurred at Silver City, New Mexico, on the raw tailings from the Bremen mill. The test was on a scale of 15 to 30 tons per day for three months, the average difference in extraction for the whole run amounting to 25 1/2 per cent of the value of the ore in favor of the Russell process. In the test at this and other mills, it should be understood that when the difference between the results by the two processes was great, the tailings from the ordinary process were treated by the "extra solution" before being thrown away.

The third opportunity for comparing the two processes occurred at Lake Valley, New Mexico, the comparison covering a period of eight months, the amount of ore treated varying from 20 to 60 tons per day. The result showed the average difference in extraction in favor of the Russell process to be 30 per cent of the value of the ore. The ore treated in this mill averaged for the last five months only 12 ounces per ton, but continued to be profitably treated until the supply was exhausted.

At Sombrerete, Zacatecas, Mexico, a large mill is now being constructed for the Russell process by the Sombrerete Mining Co. This mill will have rolls, the largest Stetefeldt furnace ever constructed, and leaching tanks of such a capacity as to hold 50 tons per charge. In the comparative test made in the old mill, and which was continued for two months, the difference between the results by the ordinary leaching process and those by the Russell process were in favor of the latter to the extent of 22 6 10 per cent of the value of the ore, or about 11 ounces per ton.

The fifth competitive run between the two processes took place at the 40 stamp mill of the Anglo-Mexican Mining Co., at Yedras, Sinaloa, Mexico, and lasted 14 months. This run was divided into three parts, the relative number of tons treated by each process varying, as the plant was being altered for the Russell process, the time occupied in altering being very long on account of the location of the mill in the most inaccessible portion of Mexico. During the first two months the Russell process was run on a scale of only two tons per day, and the ordinary process on 40 tons per day. The extraction by the Russell process exceeded that by the ordinary process by 18 1-10 per cent of the value of the ore, or 11 2 10 ounces per ton, or at the rate of about 155,000 ounces per year. During the second part of the 14 months the Russell process was run on about 15 tons per day and the old process on about 25. The result of the run was in favor of the Russell process by 17 1-10 per cent of the value of the ore. During the third part of the 14 months the Russell process was run on a scale of about 30 tons per day, and the ordinary process on 10 tons. The difference was in favor of the former by 16 per cent of the value of the ore, or about \$110,000 per year, the grade of the ore being somewhat lower than on the first run.

The sixth competitive run between the two processes took place at the 60-stamp mill of the Cusihuiriachic Mining Co. in Chihuahua, Mexico, the tests covering a period of over a year and included the treatment of about 20,000 tons of ore, containing 750,000 ounces of silver. The main part of the competitive run between the two processes took place inside of nine months, the whole time being divided into three periods of two to four months each. The results showed that during the months in which the Russell process was used on one-half of the ore and the ordinary leaching process on the other half, the net mill profits per ton were 70 per cent greater and the net mill profits per month were 85 per cent greater than in those

months in which the ordinary process alone was used. In the months when the Russell process alone was used on all the ore, the net mill profits per ton were 90 per cent greater, and the net mill profits per month 219 per cent greater—corresponding to \$15,000 per month—than when the ordinary process alone was used. The total net mill profits, due to the use of the Russell process over the ordinary leaching process, were at the rate of over \$190,000 per year.

Lixiviation vs. Amalgamation.

Five competitive runs have been made at various mills between the Russell process and amalgamation. The first covers a period of two years in the two-ton experimental plant at the Ontario mill. In this plant were made the first experiments on the Russell process, and to the liberal management of the Ontario Silver Mining Co. will be due much of the benefits mining and metallurgical interests may obtain from the process.

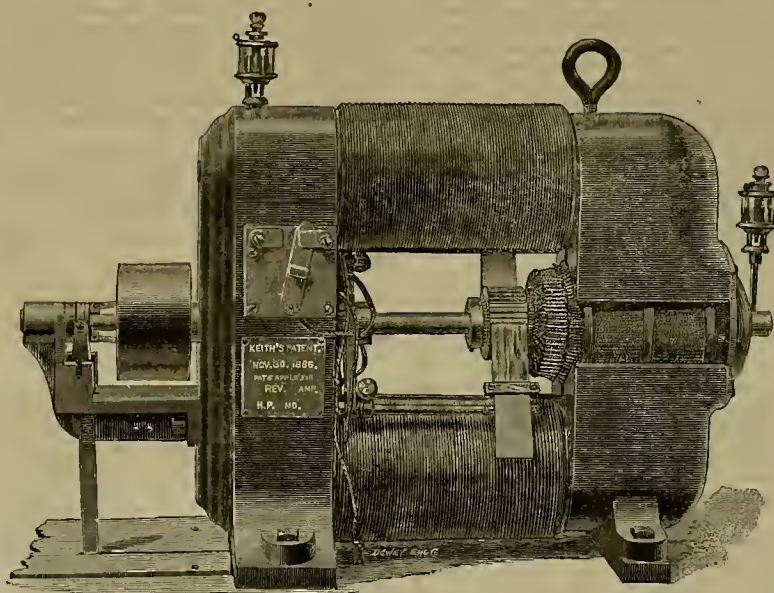
The result of the first cooperative run on Ontario ore showed that on ore crushed through a 16-mesh screen and roasted with 12 1/2 per cent of salt the results by the Russell process were higher than on ore crushed through a 30-mesh screen and roasted with 17 per cent of salt and treated by amalgamation. On ore roasted without any salt the results by amalgamation were only 35 per cent, while those by the Russell process were 85 per cent, a difference of 50 per

the total net difference over \$8 per ton, or at the rate of \$172,000 per year.

The fifth comparative mill-run was begun at the Ontario mill in November last, and is still being continued. From various causes, but chiefly from lack of sulphur in the ore, amalgamation during the above period gave very poor results. The foreman, Mr. Moffat, removed the difficulty to a considerable extent, however, as shown by the difference in results between May and June, by mixing pulverized sulphur with the salt used in roasting. This comparative run shows not only how great may be the difference between the two processes, but also how little the results of the Russell process are affected by a change in the composition of the ore. The difference in mill workings by the two processes, and in favor of Russell's, is given below by months:

	Difference per cent.
November, 1887.....	11.6
December, 1887.....	8.5
January, 1888.....	10.1
February, 1888.....	10.1
March, 1888.....	20.4
April, 1888.....	12.9
May, 1888.....	13.4
June, 1888.....	19.5
Average difference.....	13.8

The average extraction in gold by the Russell process for the same eight months exceeds that of amalgamation by 15 per cent of the gold value of the ore. In regard to the gold there is a still further difference on the side of the



KEITH'S CONSTANT CURRENT ELECTRIC MOTOR.

cent, or 35 ounces per ton. The expenses of leaching may also be put at from \$5 to \$6 per ton less than those of amalgamation at that time.

The second run was made at the Marsao mill, on Daly ore. This ore being crushed and chloridized solely with reference to obtaining the best results by amalgamation, and not with reference to the leaching, the results by leaching fell 2 per cent short of those by amalgamation during the first two weeks of the run, but at the latter part of the run averaged 1 1/2 per cent higher than by amalgamation. In this case, as for Ontario ore, the expense per ton would be considerably less than by amalgamation.

The third competitive mill-run between the two processes was made at Lake Valley, New Mexico, extending over a period of two months, and on a scale of 30 to 50 tons a day by the Russell process, and five to six tons by amalgamation, the leaching charges being 18 to 20 tons each, and those by amalgamation 1 1/2 to 2 tons. Not only were the expenses of the Russell process much less, but also the extraction by it was 12.4 per cent greater.

The fourth competitive run between the two processes took place at Cusihuiriachic, Chihuahua, Mexico. Two pans and one settler having a capacity of 1 1/2 tons to the charge were run in competition with the Russell process in tanks of 8 to 10 tons each. Although both the crushing and the roasting were conducted solely with reference to obtaining the best results by amalgamation, and not for leaching, the results were in favor of the Russell process by an additional extraction of 11.4 per cent, or 5.7 ounces per ton more than by amalgamation. This, taken with the less expense in leaching, made

Russell process in that the gold in the product by that process is paid for at the rate of \$20 per ounce, while for the gold in the bullion from amalgamation nothing is obtained. Referring again to the extraction of silver, the average amount of silver in the Ontario battery sample being 47 ounces per ton and the number of tons treated daily being 90, the additional extraction in silver alone by the Russell process exceeds that by amalgamation at the rate of over 200,000 ounces per year. Taking into account also the decreased expense of about \$4 per ton, the total net difference on the side of the Russell process is at the rate of over \$300,000 per year.

Lack of space prevents us from entering further here into the details of this remarkable process. We can only commend this subject to the careful consideration of mining men and metallurgists.

THE Wood River mine-owners are very anxious to have a reduction of freight rates on ore. Many small claims have had to close down, and the majority of even the heaviest producers are only extracting and shipping enough to pay expenses. It is claimed that with reasonable ore rates even the smaller claims would ship from one to five carloads a day. The quantity of Wood River ore that would seek a market would be about 250 tons per day. They do not want to pay over \$10 per ton.

Iron deposits, which bid fair to become valuable properties, have been discovered on Hood's canal, near Lake Cushman, W. T.

THE President has nominated Colonel Thos. L. Casey Chief of Engineers of the United States Army.

Electric Motors.

There are two fundamental systems of transmitting and distributing power by electricity. One is called the "constant potential" and the other the "constant current."

The office of the primary power is to drive a dynamo-electric machine to produce electrical energy which is reconverted to power by the electric motor or motors which receive it. The electrical energy is the condition of the power during transformation and translation. Power is expressed in foot-pounds. That is, pounds of mass multiplied by feet of motion. Electrical energy is expressed in volt-amperes. That is, a pressure multiplied by a velocity.

It makes no difference in a horse-power whether one pound moves 33,000 feet or 33,000 pounds move one foot; nor whether the pounds be more or less, as long as the feet are of the number which when multiplied by the pounds the product be 33,000. It makes no difference in one-horse power of electrical energy whether 746 amperes have one volt electro-motive force or 746 volts produce one ampere; nor whether the amperes or volts be more or less, as long as their product be 746 volt-amperes. For short the volt-ampere is called a "watt," and 746 watts equal one horse-power or 33,000 foot-pounds.

By the constant potential system of electrical transmission of power the dynamo at the primary power (water-power for instance) is constructed to produce its electrical energy having a constant, invariable number of volts; but the number of amperes varies constantly, as the work done by the motors on the circuit varies.

By the "constant current" system the dynamo at the primary power is constructed to produce its electrical energy having a constant, unvarying number of amperes; but the number of volts varies constantly in proportion to the variations in the work done by the motors on its circuit.

Under the "constant potential" system the volts are small in number and the amperes large. Under the constant current system the volts are large in number and the amperes small. For instance: 110 volts \times 678.2 amperes = 100 horse-power; 3000 volts \times 24.8 = 100 horse-power.

Under the former system the copper conductors between the dynamo and motors must be large in order to accommodate a large number of amperes. Under the latter system the conductors are small, because they have to carry a small number of amperes.

The conductors in the constant potential system may be likened to a large ditch carrying water to many water-wheels, which it reaches through pipes from the ditch, a pipe to each wheel, and the same number of feet fall to each. The larger must have large pipes, and use more water than the small ones, and in proportion to their size and power. So from the large conductor smaller ones branch to the electric motors, and each motor uses of the amperes of electricity in proportion to its capacity or work. Whatever water goes to each wheel goes to no other wheel. Whatever amperes of electricity goes to a motor goes to no other motor.

The conductors in the constant current system may be likened to a stream having a number of successive falls in it, and at each fall a water-wheel, the falls varying in height with the power required from the wheel. Each wheel uses all the water, and the water flows from wheel to wheel. So from the dynamo the amperes all flow successively through all the motors, and the motors vary in their power by their size and capacity of utilizing a greater or less number of the volts.

Constant potential motors are constructed to automatically vary the number of amperes of electric current they use in proportion to the work they do. Constant current motors are constructed to automatically vary the number of volts of electric energy they use in proportion to the work they do, as does a steam-engine governor vary the amount of steam admitted to its cylinder in proportion to the work.

In our issue of June 9th last we illustrated one of Prof. Keith's constant potential motors. In this issue we illustrate one of his constant current motors. It will be observed that their forms are substantially the same. The bracket at the pulley serves to sustain the governor. We shall take an early occasion to describe the construction and operation of this latter ingenious mechanism.

MECHANICAL PROGRESS.

The Literature of Different Irons.

A Philadelphia correspondent of the N. Y. *Iron Age* calls attention to the fact that while very much is being done in the way of investigation into the chemistry of Bessemer pig metal, very little is being done toward determining the character of foundry irons by actual analysis. We condense from his communication as follows:

The paper of Mr. Meissner upon the "Chemistry of Foundry Irons," following the contributions of Messrs. Keep, Fleming and Osterbridge in this country, and Turner in England, indicates that the attention of chemists and physicists is being directed in a channel too long neglected. For years the chemical and physical properties of Bessemer pig metal have been thoroughly investigated, and the composition and characteristics of rails, plate, etc., made from it have received almost a monopoly of attention. The results of these investigations have amply compensated for the labor and money devoted to them by the marvelous advance made in the production of manufactured steel, both as to quantity and quality. But while this progress has been taking place, we have practically stood still in the investigation of foundry and mill irons, although in the latter specialty more has been accomplished than with foundry irons; but the literature on the subject of foundry irons is less than its importance demands.

An approximate estimate of the quantity of foundry iron produced in 1887 is between 1,000,000 and 1,500,000 tons, and yet how little of it is used with a full appreciation of either its composition or other qualities. The mere matter of grading pig iron is but little understood, and traditions or customs have too often more to do with an order sent to the furnace than an intimate knowledge of the composition or characteristics of the metal used.

It is an open secret that a coating of rust upon a broken pig many times makes it acceptable and satisfactory, when, if the true face or fracture were visible, the iron would be condemned. Again, the product of certain furnaces is deemed essential, either by the foundry or by the parties who patronize the foundries, and a few tons of these standard irons kept in stock or a few pounds added to a cupola charge satisfy the supposed necessity.

This notion is not confined to pig iron, but some ores come under the same category, and the fact that ore from a certain mine or iron from a certain furnace is used is accepted as fulfilling all the requirements, whether the proportion is large or small. But that practice without investigation is not to be compared with that which carefully tries and proves the adaptability of the material used.

Mr. Meissner emphasizes the fallacy of some notions, as to the necessity of certain irons, by the analysis of Scotch pig irons, which are deemed so essential to success that they have within two years been carried into the Mississippi river and by rail to Chicago and other points. The question arises: Is this iron imported because of its cheapness, or on account of its quality? If for the former reason, our Scotch friends have the ideal cheap iron, or our Birmingham iron producers are sadly deceiving themselves for taking the cost of Birmingham iron at a price which is above the estimates sent out from that district.

An analysis of the figures shows that it is not cost but quality which causes this importation, and if quality, what were the very valuable characteristics which make it so necessary for foundry use? If the chemical constitution does not show the desirable qualities, what do physical tests determine?

It is hardly presumable that, as one contributor to the limited literature asserts, "we believe that the time is coming when pig iron will be sold on its chemical analysis, instead of the crude methods of grading at present in vogue." An investigation of the reasons why irons of certain compositions give specific results will be to the advantage of both producers and consumers. Our blast-furnace managers will find interesting nuts to crack in some of the analyses presented by Mr. Meissner, and a public comparison of results obtained will do much to awaken both the producer and consumer to a realization that without assuming that we must closely follow any fixed rules of chemical composition much can be done toward properly appreciating the merits and demerits of iron of certain grades or analyses. Such appreciation will then be based upon characteristics of the metal as determined by specific tests, and not upon visionary or uncertain reasons.

We are all familiar with the statement of a manager of a large Southern industry who facetiously asserts that "whether iron goes to one grade or another depends upon the condition of the grader's liver." Unfortunately we have relied upon a method—it cannot be called a system—which varies so much that the only grade which approaches uniformity is white iron; and from this, different blast furnaces grade upward to 4 to 6, to 16 or even to 20 grades, making the determination a fine art, requiring an expert's opinion and probably in many cases developing no chemical change between two or three numbers.

A NEW TUBE-MAKING PROCESS.—An English paper reports that Swansea is to receive a new

and important addition to its metallurgical industries. The London Siemens Steel Co. are about fitting up extensive works for utilizing a new method of manufacturing steel and copper pipes, invented some two or three years since by Herr A. Mennsmen, and now in successful operation in that country. The English firm will confine themselves to the manufacture of steel pipes. A concession has also been granted by the inventor to a French firm in Paris who will use the same method in that city for the manufacture of copper pipes. An estimate of the importance of the new process may be gathered from the fact that the capital of the German syndicate was \$300,000. The principle involved consists in casting an adjustable core, which accommodates itself to the contraction of the metal on cooling, and thus prevents cracking. The steel cup obtained in this manner is then rolled in an ordinary train. The special feature of this core used in the casting constitutes the patent granted. The principle is also applicable to gun-making, and by it the difficult and expensive process of boring is avoided.

NEW PROCESS FOR WIRE MANUFACTURE.—It is recorded that Mr. H. A. Williams of the Williams Manufacturing Co. of Taunton, Mass., has invented a machine for cheapening and improving steel or iron wire, which is calculated to make a change in many branches of industry in which iron, steel, copper and brass wire are used. The invention, which has just been patented, consists of a series of rolls in a continuous train, geared with a common driver, each pair of rolls having a greater speed than the pair preceding it, with an intervening friction clutch adapted to graduate the speed of the rolls to the speed of the wire in process of rolling. The entire process of manufacturing the smallest sized wires from rods of one-half inch is done cold. The new process obviates the danger of unequal annealing, and of burning in the furnaces, and the wire is claimed to be more flexible and homogenous than that produced by the common processes, and capable of sustaining greater longitudinal strain. It is, therefore, specially adapted for screws, nails, cables, pianofortes, and many other uses, and copper wire made by this process is claimed to have possessed of greatly increased electrical conductivity. A new corporation, called the Williams Wire Machine Co., will be formed to manufacture the machines at Taunton.

THE SAND-BLAST FOR CLEANING WALLS, ETC.—Amateurs adopt new ways and improved methods more readily than your skilled workman. As occasion offers, let amateurs try the sand blast for cleaning old stained and dingy stone walls of buildings instead of using wire brushes; also for cleaning rust from iron and sand from castings without scraping. Possibly the sand-blast may answer for cleaning floors, stairs, interior walls, ceilings and without washing or scrubbing. No patent on these adaptations of the sand-blast.

GERMAN IMITATIONS.—Making so-called "wrought-iron" anvils in Germany, and branding them "Trenton," after the New Jersey town of that name, is, no doubt, an enterprising procedure, but the Eagle Anvil Works of Trenton finds the joke has a serious side, as a good many of the German anvils get broken, and are sent to them by users to be repaired, under the mistaken impression that they were made by them. Each of theirs bears an eagle as a distinguishing brand.

STEEL FOR SMITH'S USE.—The *Railroad Gazette* reports that a firm which has added Bessemer converters to their original iron-making plant, lately sent out a large number of steel bars and rods for smiths' use. These bars were supplied to customers who had formerly used the wrought-iron bars made by this firm. The users have, however, made no complaint, and apparently found that the steel could be as readily worked and welded as the iron formerly supplied.

PHENOMENAL WIRE DRAWING.—William Riddell & Co., Glasgow, has finished for the Glasgow exhibition two pieces of wire, one of brass, 65 miles long and 48 w. g. in diameter. The other is of copper, 111 miles long, 48 w. g. in diameter, and was reduced at one process from 22 w. g. to 48, taking 40 hours continuous running to run it off. Except in the precious metals, this length has probably never been exceeded, and certainly never without annealing.

CORRUGATED IRON FOR DWELLING HOUSES.—An English writer urges the introduction of dwelling houses made of corrugated iron. He claims that they would be much cheaper than dwellings of brick or stone, and would thus effect reductions in rent. Being lined with wood they would necessarily be warm in winter. To make them cool in summer he suggests that they may be built on the plan of the Indian bungalow.

TO DETERMINE MANGANESE STEEL.—The *American Analyst* says that an approximate idea of the amount of manganese contained in steel can be ascertained by the means of the magnet. A magnet capable of lifting 30 pounds of ordinary steel or iron will only lift a few milligrams if the metal contains 20 per cent of manganese. So small a quantity of 8 per cent of manganese will nearly neutralize the magnetic attraction.

SCIENTIFIC PROGRESS.

Contradicting Mr. Darwin.

When Darwin was a young man the work that did more than anything else to give him a wide reputation as a rising man of science was his investigation of the coral reefs of the Pacific during the cruise of the *Beagle*, and his famous theory with regard to their origin, which, for half a century, was accepted by the scientific world as the correct explanation. Darwin's theory is now rejected by some of the leading authorities on deep-sea investigation. The most recent contribution to this subject is the work just published by Prof. Alexander Agassiz on the oceanic researches of the United States steamer *Blake*, during which his investigations of the coral reefs off the coast of Florida have led him to reject the Darwinian theory as correctly explaining their origin.

It was Professor Darwin's belief that the reef building polypi, which exist only at comparatively short distances below the surface, laid the foundation of their coral structures in shallow waters, and that the gradual subsidence of the ocean had enabled them continually to add to the height of their structures, while they themselves remained in the limited depths of the reef coral zone. In this way he believed the great oceanic groups of atolls which rise from very deep water were formed, and he wholly rejected the assumption that immense piles of sediment heaped on the floor of the oceans far remote from land could have made the basis for the coral formations.

In Mr. H. P. Guppy's recent paper on coral reefs he shows that this explanation, which Darwin rejected for lack of evidence, is the very theory that the recent researches have tended to support; that many of Darwin's areas of subsidence are, in fact, areas of elevation, and that the discoveries of Murray, A. Agassiz, Buchanan and others go to show that, upon vast deposits of calcareous remains, deep-sea corals are reared until they reach a level suitable for the growth of reef corals.

Professor Whitney tells us that as late as 1794 the leading text-book on geography used in American schools announced that the Alleghenies were the most considerable mountains in North America and that "the Andees and Alleghenies are probably the same range, interrupted by the Gulf of Mexico." In the present state of geographical knowledge such blunders are no longer possible, but some of our long-cherished views on problems in physical geography are receiving severe treatment at the hands of the latest investigators.

FEEDING THE FLAMES.—*London Iron* says: "Most people are familiar with the expression 'feeding the flames,' which is usually to be met with in accounts of conflagrations which are sustained and extended by reason of the devouring element attacking inflammable substances within its reach. It is, however, in another sense that we now use it, namely, that of sustaining a domestic or other fire by means of materials by which humanity has hitherto been fed. To put the matter plainly, we received a short time since a sample of block or what is generally known as patent fuel, with a request that we would test it and publish our opinion." The editor remarks that he will take an early opportunity to experiment with the fuel and gives the following as the formula by which the fuel is manufactured: Add to 1 ton of smudge 5 pounds of flour, 5 pounds of resin, 1 pound of salt, 1 pound of sodium, 5 pounds of sugar, and from 2 to 3 per cent of pitch. The cost of the whole of the ingredients bought wholesale is about 1s. 1d. The editor then continues: "But what we do not at all see is the force of literally 'feeding the flames' on those commodities which so many thousands have such a struggle to obtain for feeding themselves and their children. It may be that this point can be satisfactorily settled by Mr. Jackson, and therefore—to use another old expression—we pause for a reply. This is certainly 'feeding the flames' with a vengeance!"

PRIZE STUDIES OF TORNADOES.—The *American Meteorological Journal*, desiring to direct the attention of students to tornadoes, in hopes that valuable results may be obtained, offers the following prizes: For the best original essay on tornadoes or description of a tornado, \$200 will be given. For the second best, \$50. And among those worthy of special mention, \$50 will be divided. The essays must be sent to either of the editors, Professor Harrington, Astronomical Observatory, Ann Arbor, Mich., or A. Lawrence Roth, U. S. H. L. Meteorological Observatory, Readville, Mass., U. S. A., before the first day of July, 1889. They must be signed by a nom de plume, and be accompanied by a sealed envelope addressed with same nom de plume and enclosing the real name and address of the author.

VELOCITY OF THE SOUND OF FIRE ARMS.—Many experiments have proved that the velocity of sound, obtained by observing from a known distance the instant of the discharge of a rifle and the arrival of the sound of the detonation at the place of observation, is frequently greatly in excess of the normal rate of propagation. To determine the cause of this increase and the laws which govern it, a series of experiments have recently been carried out by M. Journe, who has presented a memoir on the subject to the Paris Academie des Sciences.

His experiments show that if a bullet is fired from a rifle against a plate of cast iron, then so long as the velocity of the bullet is in excess of the normal velocity of sound through air, the noise of the detonation and of the bullet striking the plate reach an observer situated in the plane of fire behind the plate at the same instant. If the distance of the plate from the rifle is increased till the velocity of the bullet before reaching it is reduced below that of sound, then the noise of the detonation reaches an observer before that of the shock against the plate. Hence the author concludes that the bullet, so long as its velocity is greater than the normal velocity of sound, is the seat of sonorous disturbances, resembling in character that due to an explosion, and this view he has substantiated by further experiments.

RESOLVING HYDROGEN, OXYGEN, ETC., INTO THEIR ELEMENTS.—A paper by Professor Gruenwald, recently published in the *Chemical News*, upon the spectra of hydrogen, oxygen and aqueous vapor, is an extremely important one. Gruenwald claims to have discovered, from the spectra of these gases and vapors, that hydrogen is a compound of one volume of a primary substance (b), with four volumes of another primary substance (a), and is therefore a compound substance, analogous to ammonium (N. H₄), the volume of which, on its dissociation at a sufficiently elevated temperature, is in the proportion of two to three. The substance (a) is the lightest of all gaseous bodies—much lighter than hydrogen; and (b), if we regard (a) as a univalent element, is a pentavalent gaseous element similar to nitrogen. He has also found oxygen, carbon and nitrogen to be compounds of similar substances. The element (b), noted above, corresponds with the assumed element occurring in the sun and known as "helium," thus proving that hydrogen is dissociated in the sun's atmosphere. Another unknown substance present in the sun's corona which gives the spectral line 1474, he concludes, is due to the other constituent of hydrogen (a). Much more extended observations will be necessary to prove the correctness of this alleged discovery; but the facts brought forward by the author are sufficiently confirmatory to justify the most thorough investigation of the matter.

ELECTRICITY IN PROBING.—Dr. John H. Girdner has made an extremely ingenious application of electricity in a telephonic bullet probe. The operator covers both ears with telephonic receivers to which are connected two wires. One of these terminates in a piece of steel, which the patient holds in his mouth, or which may be applied to other parts of the body where a good contact can be obtained. The other wire is attached to a delicate steel probe. Now, when the probe passes through flesh or tissue, or touches bone, nothing is heard by the operator, but when the point of the needle touches a lead bullet, the circuit is completed, and a clicking and scraping is heard in the telephone. The probe may be left in place, and serve as a guide to the knife. The manipulation of the probe is not difficult or painful and is not attended with danger. The invention is destined to increase largely the efficiency of surgical practice in cases of gun-shot wounds.

PLATINUM IN THE SUN'S ATMOSPHERE.—Messrs. Hinchins and Holden recently gave an account of certain investigations upon the solar spectrum, which seem to prove the presence of the metal platinum in the sun's atmosphere. This is the first time any lines corresponding to that element have been observed. They also find additional evidence of the presence of cadmium, bismuth and silver, which have always been considered doubtful, while the presence of lead, tin, potassium, lithium, and the cerium group is not confirmed.

CONTRACTING EFFECT OF ALCOHOL.—It is well known that sponge, wood, etc., when saturated with alcohol contract, while if saturated with water they expand. The cause of the dissimilar action may not be so well known, but is no doubt due to the fact that alcohol abstracts the moisture from porous substances. It is from this peculiar property of alcohol, in withdrawing water from organic tissue, that it derives its chief value as a preservative agent in the arts.

ADAMASCORITE is the local name of a mineral which is said to be found only in one place in the world and that is the State of Missouri. The stone is very peculiar in its structure and properties. Its cutting power is diamond-like, cutting away steel very rapidly, and still retaining an exceedingly fine edge.

DIAMONDS IN A METEOROLITE.—A cablegram from St. Petersburg, dated July 1st, says: A number of Prussian scientific men have discovered a quantity of small diamonds in a meteorolite that fell recently in the neighborhood of Kiev.

SILVERING IRON.—By a recent Austrian invention iron is given a silver surface by covering the iron with mercury and silvering by the galvanic process; then by heating to 300° C. the mercury is evaporated, and the silver firmly fixed.

A CEMENT FOR STOPPING CRACKS IN SINKS.—Take of litharge 20 parts and one of burnt lime in fine, dry powder. Make into a putty with linseed oil.

USEFUL INFORMATION.

Chinese Carpenters.

A correspondent of the N. Y. Iron Age writes to that journal as follows:

"Have just been having a time with the carpenters trying to get them to make a good joint. We are framing timbers for a shaft; and it is quite necessary that the joints should be well made, for the sine of one joint are perpetuated in all the other timbers as they are put in. The natives do very well with the tools they have. All their saws are like the ordinary huck-saws, and they are all sharpened as rip-saws, but are used indifferently for ripping or crosscutting. A line is made by snapping a string run through india ink and water instead of a chalk line, and their pencil is a piece of bamboo split up at the end and dipped in ink. The chisels are like ours, only far clumsier. Their planes are like ours also, save that they are pushed by both hands on a cross-bar handle across the top of the plane just behind the blade. Squares, bevel squares and the like are made by themselves from wood as they are wanted. Rabbeting planes and other special tools they likewise make when wanted, starting on a basis of a plane blade. A miter box they know not, and I think I must show them its virtues. Their hatchets are about the size and shape of our lath hatchets, but with about three times the amount of metal in them. A broad sash they do not have, but the adze is in constant use. The blade of the adze is about three inches wide and over all some four inches in length. Opposite the blade is a socket fitting on a wooden shank, which carries a straight handle. Their drills fit into a wooden shank, which is revolved by a strip of leather with one or more turns around the spindle and with the ends fastened to a straight stick, which is sawed like a fiddle-bow across the shank. The drills are sharpened like our drills for iron. A constant source of surprise is the suppleness of the native workman. You often see a carpenter standing by a waist-high bench with one foot on the ground and the other holding a piece of wood on the bench while he saws or planes it. They are very fond of sitting down to their work in positions we could not assume. A cramped position to a native is an impossibility, though it might be achieved by forcing him into a trunk."

The Ivory Trade is Dead.

Celluloid has or soon will effectually kill the ivory trade. The chief portion of the ivory of commerce has heretofore been derived from Africa and consists of the tusks of the large elephants of that country. The largest of these tusks sometimes weighed as much as 130 pounds and were valued as high as \$500; but there is not much doing in the business at the present time, and that little is constantly growing less. Nearly everything that was made of ivory a few years ago is now made of celluloid, and a great many other things besides. How many pianos in these days have ivory keys? Only the most expensive; and then, too, combs and brushes, umbrellas and cane handles, hiliard and pool balls, and even dice are made of celluloid which one can scarcely tell from ivory, so perfectly are they done. The latest thing, however, in the celluloid line is in the shape of playing-cards, and they will supplant the old fashioned cards altogether when they become more generally known.

Old and broken hiliard balls that are only slightly chipped or broken are readily turned down into balls suitable for hagatelle or parlor games, but those that are badly broken are thrown away as useless. If the billiard-rooms should all close up we should find little to do in the line of ivory manufacture. All first-class billiard saloons are provided with ivory balls, for the celluloid imitations have found but little favor in the eyes of hiliard players. With the pool table, however, the case is different, for the majority of pool sets are made of celluloid. In New York, where 100 sets of ivory pool balls were sold two years ago, less than 20 are now sold. Celluloid is now almost exclusively used in that branch of manufacture.

SOLDERING HOLES.—The *American Artisan* says: There are many people who think it is an easy thing to solder a hole in an old tin pan, but, like many other tricks of the trade, can only be acquired by practice. The great trouble with most persons when they try to solder anything is that they do not get the work clean—that is, scraped bright; then the tin may be all scraped off, and if they try to solder with rosin the solder does not stick. When acid is used, there may be so much on the article that the acid does no good. Then the soldering copper is apt to be too cold or too hot, and the result will be that a poor job is done.

STEEL-TIRED WHEELS.—It is stated that the Pennsylvania Railroad Company is obliged to replace annually one out of every 250 of its chilled cast-iron wheels, or four per cent. On the Lake Erie line the figure is still higher, as six per cent have there to be replaced every year. The steel-tired wheels on the Pennsylvania give much better results, as only .01 per cent have to be renewed yearly.

OIL FROM INDIAN CORN.—A St. Louis party is engaged in the business of expressing oil from Indian corn, and the new industry prom-

ises a successful rival to the best vegetable oils. From a bushel of corn, costing 35 cents, a gallon of clear amber oil is obtained, worth 75 cents, and the solid substance remaining is said to be a better article of animal food than any of the oil cakes now on the market. If anticipations in regard to the business are realized, the farmer will be enabled to obtain a good price for his corn and feed it to his stock afterward—to eat his cake and have it, as it were.

A MAILING CASE FOR LIQUIDS.—A device has been patented for use in transmitting bottles through the mails or otherwise, with a view to preventing injury to goods which may come in contact with them from the breaking of the bottle and the spilling of its contents. This mailing case consists of a round wooden box with a screw top, there being inside the box a thick lining of absorbent material, which, in case of breakage, will quickly absorb the liquid and prevent damage that might otherwise occur. As a result of this construction it is claimed that the breaking of the bottle is not followed by the escape from the mailing case of any of the bottle's contents.

CAPACITY OF PUMPS.—To find (approximately) the amount of water a pump will move per minute, assuming a hundred feet piston speed as the standard, square the diameter of the water cylinders and divide by four; and inversely, to find the size of a pump to perform a required duty in gallons, divide the number of gallons by four and extract the square root of the quotient. The result is the diameter of water cylinder required.

BRASS ALLOY.—A very good brass is made of 16 pounds of copper, 8 pounds of zinc, and one-half pound of lead. The lead should be added after the copper and zinc have been melted together. These proportions of the different metals makes the best brass that can be made with zinc and copper. For very light castings the lead should be omitted, as it makes the alloy less fluid; but in heavy castings it makes them more solid and clean.

A HANDY FURNITURE POLISH.—Make a mixture of olive oil one part and vinegar two parts. Apply it to the furniture with a Canton flannel cloth. Rub dry with another cloth of the same material. A housekeeper who uses this polish on the finest varnished furniture says it has no equal.

GOOD HEALTH.

Shun Worry and Excitement.

Regarding the preservation of youth and vigor, we find the average of longevity greater than 50 years ago. We find some men and women decaying and growing old much sooner than others. We find one man as fresh and vigorous at 55 or 60 as another may be at 35. There must be causes for these differences in the preservation of the body. And as there are causes for such variations in the condition of the body, may there not be other causes, still unknown, which may tend to preserve physical and mental vigor for 100 years, or even longer?

Mental worry and disquiet, arising from any cause, is the strongest agent in "aging" men or women. It is an incessant source of exhaustion to the vital forces. You do so exhaust yourself when you worry about your business, your family, and about anything. It carves lines on the face and bleaches the hair. A peevish young woman at 20 will look old at 30, because her peevish or worrying thought represents so much of her force used to tear her down instead of building her up.

You can have responsibilities without always worrying over them. You do not make things a bit better through such worry. You only make them worse. Worry does not plan. It does not make a clear head. It does but fume, fret, and cause indigestion and old age. It affects your sleep at night. It causes you either loss of sleep or a poor rest when you do sleep. If you carry your cares to bed with you and they are "on your mind" when you fall into slumber, they will stay on your mind all night and cause you troubled dreams. There is a healthful sleep coming of the permanent, cheerful, composed, non-worrying frame of mind, two hours of which will give you ten times more rest, strength and refreshment than the unhealthy sleep coming of the mind which entertains care and worry and makes them continual guests.

We often use up our force faster than we make it. We work through a whole day's exciting business, and are then at a theater or some place of amusement until 10, 11, or 12 o'clock. So long as the body is awake there must be outlay of force to sustain it. There can be as much exhaustion in this search for excitement or amusement as in work. We get force to sustain the body in these ex-drafts upon it in two ways—either through artificial material stimulants or artificial mental stimulants. By artificial mental stimulants is meant the excitement caught and absorbed by crowds similarly influenced, and occupied as ourselves at night. It is not a healthful nor natural source of supply. It will eventually, if relied upon, strain the body and "age it" prematurely.

Mental stimulants and the mental intoxication coming from it is evidenced at noisy, turbulent public meetings, where thousands coming together, influenced by partisan prejudices,

likes and dislikes, stamp and cheer, and cry themselves hoarse, according as the sentiments expressed are agreeable or the reverse to them. It is the stimulus produced by great numbers of minds acting on each other. It is exhausting, and every one of the participants feels the reaction within a few hours.—N. Y. Sun.

BEE STINGS.—It is a common mistake to suppose that an angry bee is certain to sting on alighting upon a human hand. On the contrary, she will usually examine the skin very carefully first with the palpi—very delicate and nervous feeling organs, which are situated near the sting. It may seem that she stings at once and without care or reflection, but a bee can do a great deal in a very short space of time, in proof of which it may be mentioned that "she can flap her wings more than 400 times per second, and that each flap involves the extension and contraction, through a nerve impulse, of the muscles employed in the wing movements." This being the case, as Mr. Cheshire says, "we shall see at once that the 'no' time difficulty is removed." When a person has been stung by a bee, he should remove the sting immediately, "if possible, by the nail, running it in the direction opposite to that by which it has entered." On no account let him take hold of the sting with his thumb and finger, or a forceps, for then he will probably squeeze more of the virus into the wound from the poison bag, which is generally left attached to the sting. Although the virus of a bee sting is a strong acid, it does not always follow that an alkali will cure it. Much depends upon the temperament and constitution of the patient, and while arnica montana and ledum palustre will give relief in many cases, in others they are injurious. We may dismiss the subject of bee stings by giving the young bee-keeper two pieces of comfort—the first, that at swarming time the bees are nearly always in an exceedingly good temper; the second, that each time he is stung he will probably become less susceptible to the effects of bee poison.—Saturday Review.

NATURE'S "SAFE CURE" for kidney diseases, and many others, is strictly purified water. So important to health is strict purity in water that it may be reasonably presumed that one of the causes of the remarkable increase of kidney complaints is in the increasing impurity of water, consequent upon our multiplying population, manufactures, etc. Says Professor Charles Mayr: "Of the thousands of chemical compounds and waste products formed in the human system many require pure water for their solution and elimination; and water so overloaded with salts, etc., as average well water will not work satisfactorily. * * * Those who have never drank pure water do not realize what an effect such water has upon the kidneys; its effects better than that of acetates, nitrates, opiates or alcohol, and for people with tendency to kidney disease or dropsy there is no better drug than pure water."—Sanitary Era.

FAITH CURES.—The latest addition to the list of victims to the "faith cure" mania is a young lady at Des Moines, Iowa. Some weeks ago she sustained internal injuries by reason of a fall. During this time she has been treated by an exponent of the doctrine of healing through faith; but, failing to receive benefit therefrom, she at length resorted to medical advice. Had she done this at the time of the accident, all would have been well, but physicians now pronounce her case hopeless, as the morbid conditions have existed too long to be susceptible to medical treatment. We are a long-suffering people, and probably a few more deaths will occur through the treatment of workers of miracles ere legislative aid is invoked against this form of fanaticism; but it would seem as if we had nearly reached the point beyond which forbearance ceases to be a virtue.

CURIOUS PHASE OF DEAFNESS.—It is often said that persons afflicted with certain forms of deafness can hear perfectly in the midst of a tumult. A locomotive engineer, upon examination by a medical expert, was found to be deaf, and, although he protested that he could hear perfectly well while in the cab, he was suspended. Some time afterward, having made vain attempts to regain his defect, he applied for reinstatement, again urging the fact of his perfect hearing while on duty. Finally, to satisfy him, the physician rode with him upon a locomotive for a long distance and put him to every possible test. To the doctor's surprise, he found him able not only to hear ordinary sounds without difficulty, but also to distinguish whispers and faint movements that were inaudible to the physician.—Boston Post.

HOUSE DRAINING.—The drain inspector of Montreal says that housekeepers should not think so hardly of draughty, cool houses in winter. He believes that many people are saved from sickness in badly drained houses, owing to unpremeditated ventilation. "Often and often," said Mr. Lowe, "the houses we would consider the warmest and best is the one where sickness prevails, owing to the imperfect drainage. There is nothing like ventilation. Housekeepers do not pay sufficient attention to the sinks. Closed sinks will get dirty, and prove breeders of disease."

Some European towns forbid the occupation of newly built houses until four months after completion, as there are nearly 5000 gallons of water used in the mortar and building of 50,000 bricks, which should first dry out.

ENGINEERING NOTES.

Windmills as Sources of Power.

There is a very general opinion that a windmill is too old-fashioned a motor to be economical and efficient. This opinion is, after all, not very well founded, even although the clumsy specimens to be seen in this country would lend countenance to the notion. The windmill has been very much neglected by our millwrights and engineers. When once they come to devote as much time and attention to it as they have to other machines, we may expect to see very great improvements effected in its construction. Our electrical engineers, it seems to us, would do well in their own interest to extend a little of their attention to the windmill as a means of obtaining power for generating electricity.

An article on "Windmills for Generating Electricity," by Mr. A. R. Wolff, in the *Stevens Indicator*, draws attention to the employment of windmills as a source of power for charging accumulators. The writer maintains that the reason windmills have not thus far been put to practical use for the generation of electricity is not due to the first cost of the motor nor to any lack of economy in its operation. The windmill, also, he points out, is not so irregular in its revolution as many suppose, the fact being that the leading American makers employ governing apparatus which automatically so varies the extent of surface presented to the wind that a practically uniform rate of revolution is obtained irrespective of direction and varying velocities of wind, for all winds exceeding a velocity of six miles per hour.

This latter velocity must be reached before windmills of good design, as ordinarily constructed, operate at the rate of revolution for which they are set. It has been found, by experience, that on an average, for at least eight hours out of 24 hours of each day, the wind exceeds this velocity of six miles per hour, the average velocity of wind, during the eight hours of run, being 16 miles per hour. Total calms in excess of two days' duration are practically unknown in the United States. The fact that the windmill is at rest, often at short intervals, aggregating not quite 16 hours out of the 24, is no objection to the use of this motor for the purposes of driving dynamo machines to charge electrical accumulators, for one of the very features and acknowledged requisites of such accumulators should be that they can be charged spasmodically, at will, and at odd times. Mr. Wolff is of opinion that the reason why windmills are not more employed than they are is because the accumulators are not yet a satisfactory and assured success. The windmill at the present day, he maintains, is in a developed state, a practical success, ready and available for this new use at once. It awaits the electrical accumulator that is a thorough practical success.—Mechanical World.

Electrical Transmission of Power.

As an interesting instance of the transmission of power by electricity over long distances, the *London Electrician* refers to that of the Phoenix gold mines in New Zealand. The current is generated by two No. 8 Brush machines, each capable of giving 26-horse power. They are driven by Pelton water-wheels, with a head of 180 feet. The current is conveyed to the motor about three miles distant, and back again by a No. 8 B. W. G. copper wire (0.165 inch thick) nearly six miles long, supported on telegraph poles. The power lost in the line is only three-horse power. A Victoria motor is used, running about 350 revolutions per minute, and the power is transmitted to the machinery by a belt.

At Hatfield, on the Marquis of Salisbury's estate, the River Lea is utilized to generate electricity, which is transmitted to the house and over the estate for a variety of purposes. Two turbines are used, one to drive a 40-horse power Siemens alternating current dynamo for lighting the house and the other to drive a 16-horse power Brush machine for arc lighting at night, and in the day for working the motors at the house and on the farm. Those at the house drive pumping and ice-making machinery, and a 24 inch Blackman air propeller fixed in the roof for ventilating. On the farm the motors are used for elevating hay and corn sheaves to the tops of the stacks for thrashing, for cutting rough grass with chaff-cutting machine, for ensilage in fields extending to a distance of two miles, for grinding corn, etc., to make fodder, and for other purposes. The motors have also been used for pile-driving, for making cofferdams where necessary in the river, and also for dredging the river and cleaning it of weeds.

LOCOMOTIVES AND CANALS.—It is supposed by many that railways and canals are irreconcilable antagonists. Recently, however, an experiment was made on the Shropshire Union canal at Worleston, Eng., by officials of the London & Northwestern Railway, which is suggestive of the lion lying down with the lamb. A set of rails was laid down on the canal bank for a distance of about a mile, and a small locomotive from the Crewe Railway Works was placed on the line. Two boats were attached by ropes to the locomotive, which drew them along easily at the rate of seven miles an hour. Four boats were then attached, and the same speed was attained. The locomotive worked very smoothly and the experiment is looked upon as a success.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK MINE.—*Amador Ledger*, July 7: Have extracted and milled 65 tons of ore from crosscut No. 2, drift from same crosscut driven 12 feet. Ore in face 8 feet wide. Mill has been closed down few hours on account of slackness of water. At present running steadily.

Calaveras.

A AND B MINE.—*Calaveras Chronicle*, July 7: We paid a visit to the A and B mine, owned by Messrs. Allen and Bishop and located near the head of Poorman's gulch, about two miles from here. Operations were commenced on this mine about a year ago. Water-power hoisting works were put up and an incline tunnel started. According to the survey the expectation is to reach the "channel" with an incline in the neighborhood of 1000 feet in length. The tunnel is now in about 800 feet, but a great flow of water has just been encountered which will require an additional amount of machinery to overcome it. At the present time about 900 gallons of water per hour are being drawn out. Mr. Arrowsmith, the superintendent, went below this week for pumping machinery which will be put in place as soon as possible. Further progress is impossible until pumps are put in.

CONTENTION MINING CO.—The Contention Gold Mining Co. was organized July 2, 1888, to operate in Mill Valley mining district. J. W. Meyer of this place is president of the company and Joshua Albright secretary and treasurer. There are eight shareholders. The company has 260 acres of placer ground in the above-named district. As far as prospected the gravel yields from eight to ten cents to the pan. They are down 65 feet on a portion of the claim, passing through 15 feet of gravel without yet reaching bedrock. The channel is traceable for two miles and a half and extends through the entire location.

El Dorado.

GOLD QUARTZ.—*Placerville Observer*, July 5: Chas. A. Gardner has opened a fine vein of gold-bearing quartz, in the old tunnel in Big canyon, on which some work was done four or five years ago by D. J. Knighton. Mr. Gardner was in town Saturday last and had some quartz taken from a pocket, that was literally alive with the precious metal.

VOLCANOVILLE.—*Georgetown Gazette*, July 7: This old mining camp lies in a northeasterly direction, by trail 8 miles, and 16 miles by wagon-road from Georgetown. The Josephine mine was first visited. We found Mr. Neugues absent. The 20-stamp mill is temporarily hung up, awaiting the setting up of the Triumph concentrators which will be ready in a few days, and the mill running. With the Triumph concentrators the Josephine mill will be the best equipped mill in the county and one of the best in the State for economic working of quartz. Several levels have been run in on the steep mountain-side, all in pay ore. The mine lies along the east side of the serpentine belt. The Cooley gravel mine, owned by Barklage, has been owned by Judge Edmondson and St. Clair Nye, for three years, price \$1000. This mine paid well in years past, but lay idle for a period. The present parties found that with a little capital and much hard work the pay channel could be reached with a new tunnel and drifted upon to good advantage, and receiving favorable terms from Mr. Barklage, they entered into the work last winter. They expect to cut into the channel some time this summer. A mile to the southeast is the Last Chance claim worked by Richard Collett, Chas. Kane and Merrick Creigh. They have a tunnel and shaft with 100 feet face. The lode averages about four feet, between blue slate and porphyry. It is thought the rock will mill \$6 or \$7 per ton. They are getting ready to put up a three-stamp mill (the old Potter mill), and expect to begin crushing in a few weeks. D. C. Webster and C. F. Lloyd are drifting in their claims on the Ross channel. Immense deposits of material, supposed to be of volcanic origin, covers much of the country about the old camp, as it does about Mr. Gregory and other portions of the upper divide. This deposit often reaches a depth into hundreds of feet. Beneath these great deposits of material exist remnants of the bed of an ancient river. Considerable wealth has been mined from accessible places beneath this deposit in years gone by, but of late years little has been accomplished, owing to the want of capital and good engineering skill.

Inyo.

SODA.—*Inyo Independent*, July 7: Mr. T. H. Flagler has been at Keeler for some weeks past putting up a windmill and pump. The machinery pumps water from the lake into ground tanks, and has a capacity of 500 gallons per minute with a moderate breeze. The water evaporates quickly from the tanks and the soda that remains is then easily gathered. The windmill method of pumping is much cheaper than steam-power, and the latter will likely be dispensed with as the former is proved successful. These windmills are cheap and quite reliable to furnish all the power required.

Fresno.

FRESNO FLATS.—*Expositor*, July 4: Mr. Taylor, from Fresno Flats, reports wonderful activity in that mining district. The Surprise mill is running with a force of 50 men. The Grub Gulch mine is in a flourishing condition and paying well. A new 20-stamp mill is now in course of construction. The Crystal Springs, a new mine, is expected to pan out well. A road is already being built to it, and a mill is in contemplation. The Nob Hill and Gambetta mines are also in a flourishing condition, and are paying well. There will be four mills running during the present season.

COPPER.—*Cor. Fresno Expositor*, July 4: Prospects in this district are still active. A vein of fine-looking copper ore has been struck on Kings river by the McDowell Bros., which not only carries a great deal of copper but considerable silver. The Peterson Bros. have crushed several tons of rock from their Valley Vein mine which has paid them handsomely. In their tunnel the vein is about a foot in width, and they have run about 30 feet into this chute and it looks no more like giving out than when

they first struck it. This is the same chute which they have in the bottom of their lower shaft, and which has continued down from the grass roots, so that now they have over 125 feet of backs which they can stope out. Messrs. Ninnis, Jensen & Fritch appear just as happy as the Peterson Bros., for their copper prospect has turned out even better than they anticipated. They have a large pile of first-class ore on their dump. Messrs. Hutchison & Sharp have quite an amount of ore which is now being shipped or about to be. Their vein is now about four feet in width, and their ore assays as high as 70 per cent. Messrs. Wyatt & Co. are still working their Fancher creek mine.

Mono.

DIANA MILL BURNED.—*Inyo Register*, July 5: Benton suffered a loss last Saturday night in the total destruction of the Diana mill. The fire, when first discovered, was a small patch of blaze, but by the time the townspeople could reach the scene the entire roof was on fire. It is supposed that a spark from the engine, which had been running till some time that evening, had caught in the shingles and burned slowly for some hours, at last attaining dangerous size. Jno. F. Millner, the owner, says \$20,000 would not compensate for the loss, which is all the heavier because the mill was just now making a very profitable run. A quantity of rich pulp awaiting further work was almost all lost in the ashes. The insurance on the property was light, not above \$5000 at the most. We are told that there is a possibility of rebuilding. The disaster will be a severe one for Benton.

Nevada.

THE NEVERSWEAT.—*Nevada City Herald*, July 7: The owners of the Neversweat mine are liable to wake up this section by showing a mine of great value. The shaft is down 300 feet. Three years ago the company started a tunnel to strike the shaft at that depth. They have got in 1600 feet, and will be under the shaft some time this week. The tunnel was run on the line of the ledge. The width of the ledge in the bottom of the tunnel is now two feet. A crushing was made last month from the rock taken out while running the tunnel. Part of it was sent to the Selby Smelting Works, San Francisco, and part worked by mill process here. That sent to San Francisco yielded \$200 per ton. That crushed here yielded about \$80 in free gold, exclusive of the sulphurets. The mine will be worked by water-power, which is obtained from Slate creek. They use an 8-foot hurdy-gurdy wheel and double nozzles. Not much water is required for power.

NORTH STAR MINE DIVIDEND.—*Grass Valley Union*, July 7: The North Star Mining Co. has declared its first dividend, payable on the 11th inst., of 50 cents per share on the capital stock of the corporation, which amounts to \$50,000 on the 100,000 shares. This is a good dividend, and no doubt it is the forerunner of others, as the mine is understood to be producing profitably. This is encouraging for a mine that was permitted to lie idle for years upon the theory that its wealth was exhausted.

Placer.

MINING SITUATION.—*Herald*, July 7: In the mining sections a great deal of work has been done in opening mines and preparing for further development. Sufficient time has not yet elapsed to determine the channels, but the prospects show that before the present season shall have ended several new and paying mines will be in operation. Quite a list of mines on the Forest Hill Divide have been purchased by San Francisco capitalists who are preparing to operate them as soon as men and machinery can be set to work. Thus the whole country is doing well, and no one except the hydraulic miner has any reason to complain or growl. He has a right to complain, and should keep up his fight until the Government assists him to work his claim unmolested by spies or sheriffs.

Plumas.

PAYING.—*Plumas National*, July 7: The Lucky "S" quartz mine, under the management of Uncle John Hardgrave, is paying \$25 per ton. Chatty & Bro., in Granite basin, are working \$60 rock. The ledge is about one foot thick.

San Diego.

PACIFIC MINING DISTRICT.—*San Diego Union*, July 7: The Pacific mining district is highly spoken of by T. Ramsdell, the mining expert who has just returned from a visit to the mines. Only development is necessary, he says, to produce an immense output of mineral gold and silver. The mines will, he says, finally be classed as silver and are exceedingly rich. The mineral development alone, he says, will demand the completion of the Cuyamaca railroad, and with reduction works at San Diego, will be a great source of wealth to the city.

Shasta.

GOLD BARS.—*Redding Free Press*, July 7: The gold product from the Squaw creek mines still enriches the world. We learn that Joe Josephs brought in from the Riley and Bliss mine on Monday last, \$4000; and Jack Conant, from the Uncle Sam mine, about \$5000. Jack took half of this to San Francisco with him.

IRON MOUNTAIN SILVER.—Sixteen silver bricks from the mine at Iron Mountain were shipped from Redding Thursday to the Selby Smelting Works. These bricks average \$1000 apiece, making \$16,000 in silver.

Sierra.

NEW FIND.—*Sierra Tribune*, July 7: Frank Cook brought a batch of fine rock down from Hog canyon the other day. It was taken from a new find.

SOON TO ARRIVE.—*Nevada Transcript*, July 7: The 40-stamp mill to be put up on the Red Chief quartz mine on Kanaka creek, Sierra county, will probably arrive here next week, and will be transported by wagon as rapidly as possible to the claim. The Red Chief Co. appears to have a long purse behind it.

Siskiyou.

STEAMBOAT CLAIM.—*Yreka Journal*, July 11: The Fort Jones Gravel M. Co., now working the old Steamboat claim, near mouth of McAdams creek, cleaned up a few days since from the gravel washed during reopening of claim, and realized 20 ounces.

Trinity.

EAST FORK.—*Journal*, July 7: Capt. Weaver, superintendent of the Golden Chest, has 30 mules on the trail between North Fork and East Fork

packing the machinery for the above-named mine. He will have the work of packing completed in a few days, when the construction of the mill will be begun in earnest and pushed to completion as early as possible. It will probably be several months before any bullion will be shipped from the mill. Several locations have been made during the past month, and some of them show very flattering prospects.

DEADWOOD.—Jo. Falan is working on the old Willey mine and is taking out very rich rock. Geo. Klein has two locations on Deadwood and is getting good prospects on the North Pole location in two places. The latest discovery was in the tunnel just above the mill, and looks well; he is now sinking on the ledge. The other prospect on the North Pole yielded \$60 to the ton from 7 tons crushed. Mr. E. B. Lamb has run the tunnel on the Red Diamond mine in about 60 feet, and has struck the ledge which he is now following. The vein is 30 inches wide and looks well; the quartz carries free gold and the sulphurets are rich. Mr. Lamb's location is on the north side of Deadwood creek and contains three ledges; the other two prospect better in free gold than the Red Diamond, but are smaller ledges. The ledge of the Red Diamond is well defined and lies between porphyry walls.

A GOOD CLEANUP.—*Journal*, July 7: Mr. W. J. Leavitt came in from East Fork Tuesday, with \$2600 worth of bullion as a result of a cleanup from 27 tons of ore from the Enterprise mine. The quartz of the Enterprise is very uniform, averaging \$100 to the ton, since the present owners have taken charge of the mine.

DID WELL.—The Segalia placer mine on Red Hill has made an exceedingly good cleanup. The parties interested were happily disappointed by obtaining much more than they anticipated. They were put to a heavy expense in putting a suspension bridge across Trinity river last summer and many experienced miners talked discouragingly concerning the affair. Nearly all the debts incurred in consequence of bringing the water into the mine will be paid off this season, and if a fair run is secured for next season there will be a surplus for the owners.

Tuolumne.

EXPERIMENTAL.—*Tuolumne Independent*, July 7: The Experimental mine made a cleanup last week, and as a result a nice brick was obtained. The run was 26 days, yielding the boys very fair wages. Many disadvantages and drawbacks hindered the operations. These will be overcome next time. The company is composed of Messrs. L. A. and John Engelke, J. P. Conlin, Henry Dunn, Geo. Stayton and Geo. Bonifoy.

CLOSED DOWN.—The Buchanan mine closed down last Saturday. About 60 men were discharged. No definite reason for this sudden stoppage of work is given, but rumors of "Fourth of July, sale of half interest, change of management, rock don't pay, etc., etc." continue to circulate. This was the largest, and gave employment to more men than any mine in the county. It was supposed to be in a thoroughly prosperous condition, had formed quite a town around it, and the closing down was a surprise to every one.

QUARTZ.—*Sonora Democrat*, July 7: It is said that a recent crushing of rock from the lower levels of the Patterson mine yielded handsomely. Messrs. Gillis & Rice of Tuttle town are taking out considerable gold right along in their pocket mines on Jackass Hill.

STRUCK IT.—Messrs. Louis Page and David Oliver have struck it big in the Old Fuchs claim above Saw-Mill Flat. We do not know the exact amount, but it certainly will reach well up in the thousands. The bonanza came in during the early part of this week, and at last reports the gold was still coming out in large quantities. As much as \$4000 was taken out in two days. It will be remembered that this is the claim on which Louis Page erected hoisting works last winter. Even under adverse conditions he worked away with strong hope and much energy. The considerable depth of the lowest workings (on which the pockets are now found), the terrible caving condition of the walls, and the large quantity of water to contend with did not discourage him. Success came at last. His partner, David Oliver, seems to be attended by fortune wherever he goes. No one in this county has been so singularly fortunate.

CEMENT AND GRAVEL.—Messrs. C. C. Gurnee and others have purchased a cement and gravel mine $1\frac{1}{4}$ miles above Byrne's ferry on the Stanislaus river. The name of the Stanislaus Tunnel and Mining Co. has been adopted and big works will shortly be commenced. From Mr. Frank McCann, one of the parties, we learn that it is proposed to erect a quartz-mill and several mammoth rock-breakers, the latter being intended to crush the cement and gravel very fine preparatory to going into the mill. Thus by the larger part of the reduction work being performed by the rock-breakers it is estimated that about five tons of material to the stamp can be crushed. The works will have a capacity of at least 100 tons per 24 hours. The claim embraces 480 acres. Initial operations will be commenced 300 feet above the bed of the river at a spot which physically and in valuation is the key to the entire channel. Mr. McCann states that the entire cost of mining and milling the material will not exceed \$7 per ton.

NEVADA.

Washoe District.

IOWA.—*Virginia Enterprise*, July 7: East drift face is in vein porphyry and clay with some quartz.

CON. IMPERIAL.—Are still engaged in repairing the main north lateral drift.

KEYES.—Good prospects are still being obtained in the exploring drift on the 280 level.

BENTON.—Are making fair headway in the drift that is being run north on the 725 level.

OVERMAN.—About 280 tons of ore a week are being extracted from drifts on the old upper levels.

ANDES.—The winze that is being put down below the 240 level is still in quartz of promising appearance.

OPHIR.—No. 2 upraise is up 102 feet above the track floor. It shows no important changes of material.

SAVAGE.—Are stopeing ore from the north and south drifts on the 400 level, also from the south drift on the 500 level. About 80 tons of ore per day are being mined at points between the 400 and 900 lev-

els. The pulp assays average \$20 a ton. The amount of bullion on hand and heretofore shipped for the month of June amounts to \$34,550.

MEXICAN.—East crosscut No. 1 from the main north drift is out 172 feet and continues in vein porphyry.

SEGREGATE BELCHER.—Good progress is making in the east drift which is to connect with the Overman winze.

ALTA.—The ore-producing sections are looking about as usual, and the mill and concentrators are steadily at work.

CONFIDENCE.—The daily shipments of ore to the Brunswick mill average 182 tons, and the battery assays average \$28 per ton.

UTAH.—On the 372 level opposite the south drift a north drift is advanced 160 feet. The formation is vein porphyry and quartz.

POTOSI.—The stope joint with the Chollar are yielding the usual quantity and quality of ore, which is being worked at the Nevada water-mill.

SCORPIO.—The south drift on the 300 level has now a total length of 370 feet. The formation is about the same as at date of former report.

BEST AND BELCHER.—El Dorado Tunnel: North-west drift from main west drift advanced 32 feet; total, 368 feet. The face is in porphyry.

LADY WASHINGTON.—The crosscuts from the upraise at points above the 725 level are in a promising formation of quartz, clay and porphyry.

WEST CON. VA. & CAL.—The new hoisting machinery is working well and smoothly, and good headway is making in sinking the main shaft.

UNION CON.—The north drift from west crosscut No. 2, on the 1300 level, is out 93 feet, and the south drift started from the same is out 32 feet.

BULLION.—The south drift from the bottom of the winze on the 640 level is making favorable progress. There is no change of material worthy of note.

SIERRA NEVADA.—On the 520 level the south-west drift is out 1769 feet. Its face is in a mixture of quartz, clay and porphyry. It still shows some water.

YELLOW JACKET.—The daily ore shipments average 90 tons. The stope continues to look well. A good deal of prospecting work is in progress at several points.

CHALLENGE CON.—On the 1000 level the north-east crosscut is out 33 feet. The face continues in vein material. Good headway is being made with all repair work.

WEST YELLOW JACKET.—A large belt of rock has been encountered in the face of the drift, but it appears to be a mere rib, and will probably be passed through in a few days.

ALPHA.—Explorations are still continued on 222 and 382 levels, and good headway is making in sinking the main shaft, which will be put down to the 500 level before drifting.

BALTIMORE.—Some good ore is being cut into on the 300 level west, and the outlook is good for finding a large body that will pay for milling. The pumps are now doing good work.

BELCHER.—All is now nearly in readiness for starting up the hoisting works recently erected at the old shaft. The starting up of these works will greatly facilitate all underground operations.

CROWN POINT.—On the 600 level the raise is still showing streaks of ore of good grade. On the 700 level the southeast drift is out 45 feet, and the east crosscut started from the end of it is being pushed ahead in promising vein material.

CHOLLAR.—The mine is looking well in all the ore-producing sections, and the usual amount of ore is being reduced at the Nevada mills. The station at the foot of the main incline on the Suro tunnel level is about completed, and ready for the timbering.

GOULO AND CURRY.—From the 250 and 300 levels extracted and shipped to the Douglass mill 105 tons of ore during the week, battery samples of which show an average assay value of \$30.30 per ton. West crosscut No. 2, started from the main south-west drift, has been advanced 33 feet. The formation is quartz and clay. There have been worked at the Douglass mill during the month of June 1000 tons of ore, which yielded \$16,026 in bullion.

OCCIDENTAL.—Shipped to the Atlanta mill during the week 113 tons of ore, and to the Excelsior mill 26 tons. The former showed a value of \$23 per ton and the latter the same per ton, from assays made from wagon samples. Worked during the month of June at the Atlanta mill 465 tons of ore, which yielded \$5903.16. Worked at the Excelsior mill during the same month 300 tons of ore, the bullion yielded by which is now at the assay office in Virginia City.

HALE AND NORCROSS.—During the past week there were hoisted 1819 tons of ore from the 600 and 700 levels, and shipped to the Mexican mill 1100 tons, and to the Nevada mill 525 tons. All the ore-producing sections of the mine continue to look well. The extraction of ore from the west upraise will be resumed next week. On the 400 level No. 1 east crosscut has been extended 36 feet. There is on hand and heretofore shipped bullion for account of June amounting to \$150,000. Full returns from the mills for June account have not yet been received.

CON. CAL. & VA.—On the 1465 level the ore-producing sections continue to look well, and are yielding the usual quantity of ore. The east crosscut from the top of the north upraise on the 1500 level is still in ore of good quality. The north drift from the north stope at the north end of the main north drift is still in quartz that shows value by assay. The ore stops on the 1600 level are still looking and yielding well. The south drift from the Ophir east crosscut is out 60 feet in Con. Virginia ground. The usual amount of ore will be shipped to the river mills during the week.

Aurora District.

GOOD INDICATIONS.—*Esmeralda News*, July 7: M. Carabantes has been working on the Consolidated No. 2, of which he is the owner. He has a tunnel in 33 feet, with good indications of striking the ledge. He expects that when the tunnel is in eight feet further the ledge will be exposed.

Eureka District.

ORE SHIPMENTS.—*Sentinel*, July 7: The following number of tons of ore were shipped from the mines of the district to the furnaces during the week:

Silver Lick mine, 34 tons; Dunderberg, 42½ tons; White Pine, 5½ tons; Geddes & Bertrand, 12½ tons; Bob Waters, ½ ton; El Dorado, 3½ tons; West End, 6½ tons; Marston Farrel, 2½ tons, and the Needle, 3 tons. From Woodchopper, 9½ tons, and Leonie, 3 tons.

Bristol District.

COPPER.—Pioche Record, July 3: Two tons of copper bullion were brought in from Bristol, Wednesday, for shipment to Salt Lake. It is a part of the product of the recent short run of the small furnace there.

Moss District.

BLACK PRINCE.—Esmeralda News, July 7: The Black Prince mine is about 3½ miles from Kinkead. We are informed that there are 300 tons of copper ore on the dump and that three men are kept busily engaged extracting more. There is an eight-foot ledge of copper ore in the Black Prince, average assays of which give 22 per cent. This mine is further developed than any mine in Moss district, and is owned by Knapp, Laws & Warner.

Ophir Canyon District.

MILL RUNNING.—Belmont Courier, July 7: R. H. Robinson of Ophir reports his gold-mill running steadily and doing good work.

Osceola District.

THE PLACERS.—Virginia Enterprise, July 7: These mines, situated on the west side of Mount Wheeler, White Pine county, are to be thoroughly worked. They cover a large area, and water is to be brought to them at a cost of \$120,000. The supply of water will be 2600 inches for seven months each year. All parts of the ground have been prospected by shafts and by actual workings. In all, over \$40,000 have been taken from these placers, much of which was in large nuggets. Heretofore the great trouble attendant upon the working of these placers has been lack of water. In the mountain slopes, on which these placers are situated, are doubtless immensely rich quartz veins, which will probably be found when the placer ground comes to be washed over by hydraulic process.

Pioche District.

STOPPED WORK.—Pioche Record, July 3: It is found that the Yuba ore does not contain a sufficient per cent of lead to admit of its being successfully concentrated, and yesterday the vanning machines were shut down. A good portion of the silver in the ore is contained in gangue so light that it floats over the tables and is lost in the tailings. The vanning machines erected for the purpose of concentrating the ore work well, and successfully concentrate the old tailings now at the mill, though the percentage of lead contained in them is small. Arrangements will probably be made by which all the old pit will be worked over.

Seligman District.

THE CONCENTRATING WORKS.—Eureka Sentinel, July 7: S. R. Krom, the New York inventor and owner of the Krom Machine Works, returned here from Seligman last Wednesday morning, having completed some important alterations in the concentrating works at that place. It appears that the original plans of the mill were not followed, and these alterations therefore became necessary. Mr. Krom thinks that there will be no trouble about the mill doing its work effectively after this, and expects shortly to receive orders from Eugene N. Robinson for nine additional concentrators, the machinery of the mill being adapted to the requirements of 18, nine of which are already kept working to their full capacity. Recent work and developments have shown that the ore in the Pursell series of mines is practically inexhaustible, and while no one has even attempted to show that the ore is very rich, there is no reason why it should not improve in quality, as we learn that it does, as depth is attained. From Mr. Krom we learn that Mr. Robinson contemplates erecting smelters at Seligman for the reduction of the concentrates near the mill, but this will depend necessarily on their chemical contents and the facilities for obtaining the requisite fluxes on the spot.

Taylor District.

ARGUS.—White Pine News, July 7: Better ore is being encountered in the lower levels of the Argus mine and the force is being increased as necessity demands.

Tybo District.

PRODUCING ORE.—Belmont Courier, July 7: Hank Metz informs us that the Ma Alta mine, Tybo, is looking well and producing good ore. In fact as developments progress the mine looks better and better. The first-class ore is shipped to Salt Lake for treatment, and the second-class is sold to the Nye Mining Co. of Tybo. Mr. Metz thinks that Tybo is on the eve of prosperous and busy times. N. S. Trowbridge is now working successfully ores that contain 15 ounces of silver to the ton, and netting a satisfactory profit for the Nye Mining Co. Custom ores are worked in this mill and the chlorides of Tybo and contiguous camps need not ship their ores for treatment away from home.

Tuscarora District.

GRAND PRIZE MILL.—Times-Review, July 6: All is now activity at the Grand Prize mill. Preparations are being made for a lengthy run on the ore left in the slopes last winter, and the new ore development recently made on the 200-foot level which daily increases in size and richness as the drifts are extended. The mill is being put in working order as rapidly as possible and fuel and other supplies are accumulating.

NAVAJO QUEEN.—Fair progress is being made in the northeast drift, 200-foot level.

FOUND TREASURE.—Some high-grade ore is being taken out. Water continues to decrease.

NORTH BELLE ISLE.—The mine from the 300-foot level has been connected with the 400-foot level, materially improving the ventilation.

NORTH COMMONWEALTH.—North drift from west crosscut on the first level has been extended 25 feet. The vein is looking very favorable, yielding some high-grade ore. The south drift has been extended 16 feet. The vein is about two feet wide, but the ore is not as good as in the north drift.

NEVADA QUEEN.—On the 350-foot level the stopes have been extended both north and south, improving both ways, and are looking well the entire distance. Very fine ore is being extracted 130 feet above, where the chute from the 200-foot level is being straightened. The vein is large and high grade. The 400-foot level of North Belle Isle is very close to the line, and very high-grade ore in the

face. They will reach the line within a week, after which the Queen will continue the work. It is a fine development and has every appearance of being the continuation of the ore body opened on the 350-foot level. Average car samples for the week, \$232 per ton. Repairs on the mill will be finished by Sunday, the 8th instant.

COMMONWEALTH.—Work has been resumed in No. 1 north drift to open up the ore body cut in the shaft, which has been followed north about 90 feet, and is extremely rich ore. East drift, south of the shaft, has been connected with the main south drift, 150-foot level, by a crosscut, making the ventilation first-rate. Have resumed work on the ore going east, which is looking well. Average assay (car samples) of ore hoisted, \$619 per ton.

ALASKA.

PLATINUM.—Juneau Mining Record, June 30: Glacier Bay district is attracting some attention and several good claims have been located. Messrs. Summers & Van Brocklin have about 25 tons of ore on their dump, some of which it is said will assay nearly \$400 to the ton. It is said that miners in the Yukon country, while working the placers, find large quantities of platinum, which they throw away, believing it to be of no value. This is a great oversight, as that metal has quite a commercial value.

ARIZONA.

VARIOUS MINING CAMPS.—Journal-Miner, July 4: The Old Reliable, in Bradshaw district, maintains the title to its name. The Last Chance, in the Bradshaw mountains, is said to show up for the amount of development as well as any claim in the county. Philip Richardson, from the Congress, says the main shaft is now down over 400 feet, the ore body being continuous the entire distance. The second shaft is also down now over 200 feet with good ore all the way. John Curtin and Nelson Gable have made good progress in running the tunnel on the Lion mine, in Maple gulch, and are in exceedingly good ore. The ore body is increasing in size as well as in richness as progress is made in the work. Walter Wright was in town yesterday with 49 ounces of gold bullion which he had extracted in the Del Pasco mill from rock from the Wild Pigeon mine. He says that the mining outlook was never so bright for the Bradshaw country as at present. All the claims which are being worked are looking well. Brann & Mitchell have over 400 tons of good ore on the dump of the Veteran mine and have started up the Wonder mill crushing it.

COLORADO.

NOTES.—Denver Republican, July 7: Work has been resumed on the Iron Mask mine at Red Cliff. The Republican mountain mines at Georgetown are increasing their output. Some good ore has been found near Pitkin, on the north side of Hall's gulch, in a well-defined contact.

SAN MIGUEL.—Journal, July 7: Owners of prospects on Bear creek now have an opportunity to test their ores at the Cropsy mill. Frank Mauney and French Joe made a new discovery on Mill creek this week that bids fair to develop into something unusually good. Another tunnel to cut the Sheridan mine 500 feet lower down than the one now being run was surveyed and started this week. The Silver Bell at Ophir is making regular shipments and is showing better than ever before. The Gold Chicken mill is now running full blast under the supervision of John Flood. The mine is at present working a small force.

DAKOTA.

REDUCTION WORKS.—Deadwood Pioneer, July 4: It is with genuine pleasure that we are at length able to make the announcement that the first active step has been taken toward preparing the grounds for the erection of the Deadwood Reduction Works company's leaching plant. Surveys and maps have been completed by Engineer Thos. H. White, and yesterday a force was taken to the site and started at work on trenches, ditches and other excavations necessary to be made before the building is erected. Plans and specifications are looked for from Mr. Clark. At once these are received, so that the directory will be enabled to intelligently proceed with execution of the plans, a larger force will be employed and work on the building begun.

IDAHO.

GOOD FOR THE SCHOOLBOY.—Wood River Times, July 7: A four-ton lot of first class ore was brought down from the Schoolboy claim, in Croly gulch, this week, and sampled and sold. It carried 82½ ounces silver and 62½ per cent lead, and netted the owners about \$100 per ton. This was only a sample lot. Now that they know its value, the owners will extract more ore.

THE BUTTERCUP A MINE.—Very encouraging reports come from the Buttercup claim—a somewhat recent location owned by McFarland & Sutherland, and situated about four miles north of Clarke's station, at the upper crossing of Willow creek. This claim, it is stated, is showing a huge vein of first and second-class ore, and a tunnel driven in depth has demonstrated the existence of a high of over 200 feet of solid galena, and a width of about 18 inches of first-class, and from one to three feet of second-class ore. The property is already spoken of as one of the best shown up on Wood river, and as being second only to the Minnie Moore.

A GENERAL SAMPLE FROM THE LEAD BELT.—About 2½ tons of ore were brought in yesterday from the lead belt near Era—the same being one-half of a general sample made up from their properties by the mine-owners in the vicinity. The other half of the sample lot will be received in about one week. When received the whole will be sampled, and if the returns are remunerative shipments will be made from several mines there.

LOWER CALIFORNIA.

RICH ROCK.—Pasadena Union, July 7: Frank Voight, who returned Saturday from Ensenada, Lower California, brought some very rich gold rock from that section into the Union office this morning.

The rock showed considerable free gold and will probably run \$400 or \$500 a ton. He also exhibited a gold button which had been taken from a quantity of the rock.

MONTANA.

PROSPECTS.—Anaconda Review, June 29: A trip up Foster creek reveals some very fine prospects. The Ontario, which Messrs. Davidson and Sawtelle have bonded to Edwards & Barker is looming up. They are sacking some beautiful carbonate ore. Just above the dam we find a group of cabins, one of which is owned by Mr. Canovan. John has a good miner working with him and they are sinking an incline on their claim. They will probably send a carload of ore out some time this summer. Messrs. Young and Churches have a fine vein of fire clay near by, which we learn stands as high a test as anything in the country. Mr. Young is working on a claim from which he is sacking a little ore daily. It is high grade (200 ounces), but the pay streak is small, although it gives good indications of widening. At the next cabin the owners of the ranch, Messrs. John Cadle and Ben Caspar, are working on the Casius Bennington ledge and piling up some 150-ounce ore. They have several more flat ring prospects up here, probably the next best of which is the E. L. K., from which they have sacked considerable 500-ounce ore, but the pay streak is narrow and the headway is small. The formation here is mostly lime although the lime capping is shallow, as granite is plainly seen at most anywhere at the creek level. The boys have some claims located further up which are in granite on both sides and which show good ore at the surface. The general impression one gives of this section is a most favorable one, and there is no doubt but the head of Foster will be heard from soon in a manner not to be forgotten. Good reports continue to come to us from Olsen's River View, in Olsen gulch, in which a rich strike was recently made.

RICH NEW QUARTZ DISTRICT.—Helena Mining Review, July 6: There is no longer any reason to doubt the richness or the vast extent of the ores lately discovered on Cold Spring creek, 20 miles south of Horse Plains, Montana. Several specimens from various claims there would indicate wealth for their owners. It is believed by experts that these leads are the ones from which came the placer gold that was taken out on Quartz and Cedar creeks, in such vast quantities, 20 years ago. Several shafts are now down 20 to 100 feet and the ledges grow richer in the precious metals as the work progresses. Capitalists from Helena, Butte, Anaconda, Portland and the East have been attracted to these new mines, and after making personal inspection of the claims have made several heavy investments. E. M. Parks, an old prospector of Missouri county, one of the first on the ground, located a good slice of the gold quartz, and a few days ago sold a one-third interest in it to a Portland syndicate for \$30,000 cash. He asks an equal sum for another third, and says the remaining interest remains with him to comfort his declining years. Colonel Geo. W. Irwin of Butte and E. B. Taylor of Anaconda lately spent several days there, pronounced the indications the best they had seen in years, and are reported to have secured some important options. This district has been but sparsely prospected and there is doubtless a rich field here for expert prospectors. A great many of them are going in from Horse Plains, realizing the fact that this is the nearest and most practical railroad point at which to outfit and from which to start. There is a good ferry there and one of the best mountain trails in the West runs direct to the mines. Fifteen men have been at work for two weeks past clearing out the old Adams trail, over which parties can now ride into the heart of the new diggings in five hours.

NEW MEXICO.

MALONE.—Southwest Sentinel, July 7: Several men are employed on the Young Man mine near Malone, all being engaged in development work. The directors of the company are expected daily, and on their arrival will make a thorough inspection of the property, and it is rumored that a full force of miners will be employed and the mine opened in first-class manner.

LAKE VALLEY.—Silver City Enterprise, July 7: The Silver Mining Co. of Lake Valley, successor to the Sierra Grande Mining Co., has paid a five per cent dividend, and will probably pay another of the same amount, after which it will still have \$50,000 in its treasury. Good, that! Hon. John Bragaw from Georgetown says that T. B. Pheby is taking out more ore than was ever taken out at Georgetown, and will start the mill again in a few days. He has about 40 men at work. Work was resumed on the Grand Tower of Gold Hill, by Lewis & Cottrell, four weeks ago. In dressing up the mine an 18-inch vein of \$175 ore was discovered on the hanging-wall which is now being taken out, and will probably be shipped to the Flagler works of this city for treatment.

COONEY CAMP.—A big strike in the Oakland mine. Not long ago Mr. Huson came from Denver and opened up this mine, taking from or near the surface a carload of ore and shipped it to Denver, which netted him a nice little profit, since which time he has been sinking on the vein and is now down 50 feet. About a week ago the vein commenced widening and growing richer. Now it will require crosscutting to ascertain the width. The shaft is 57 feet and is in solid quartz with two pay streaks of high-grade ore, one 16 inches wide and the other four inches, that will run from \$200 to \$500 per ton; the balance is good milling ore that will run from \$20 to \$80 per ton. There is on the dump from 200 to 300 tons of ore that will average \$50 for milling, and two-thirds of its value is gold.

GOLD HILL.—Silver City Sentinel, July 7: The increased activity in mining circles has been the means of centering and directing attention to Gold Hill, the most promising gold-bearing ore in the Burro mountains. The first discoveries were made in 1884, and attracted considerable attention in mining circles. The year following these, the first locations, little was accomplished aside from the annual assessment, but enough was ascertained to prove to the most skeptical that the new camp was infinitely better than the surface croppings indicated. The Indian troubles of 1885 in a great measure retarded development, and it is a well-established fact that negotiations for properties in the Gold Hill dis-

trict were suspended, because of the unsettled condition of the country as they related to Indian affairs. The miner and prospector, notwithstanding the risks to life and limb, pursued his calling, and to-day is the proud possessor of mining claims which are destined in several instances to yield him fortunes. The Standard mill is running full time; and the results obtained under the management of Mr. Coleman are very flattering. A run of 48 hours, followed by a partial cleanup only, gave a return of \$1800 in gold. The Grand Tower, the property of Lewis & Cottrell, is rapidly taking a leading position among the coming silver mines of the country.

OREGON.

LA BELLEVUE.—Bedrock Democrat, July 4: The Democrat reporter had the pleasure yesterday of conversing with J. B. Cabell, one of the owners of the La Bellevue mine on Onion creek, this county. In regard to his mining property, the La Bellevue, Mr. Cabell said: "We now have a tunnel in on the ore vein 450 feet, at which point the ledge is 11 feet in width between walls, and the ore will average \$50 per ton throughout. In depth on the ledge we are 250 feet, and can tap the ore body 1500 feet below the surface by driving a tunnel low down on the mountain. We are now taking out ore which we will ship to Denver for reduction. Fifteen tons are now in this city ready for the cars, and 30 tons more will be here as soon as teams can deliver it. The ore we ship works from \$250 to \$500 per ton, and we are now taking out some ore that will go \$3000. We employ eight men constantly, and will most likely put up a concentrator and work about 20 men before winter comes on." The La Bellevue has more than paid expenses of development from the start, and cannot now be purchased of its owners for less than a quarter of a million dollars. Such mines as the La Bellevue, Eureka, Excelsior, Columbia, Herculean, Gray Eagle, California, and a dozen other well-known bonanzas, will bring a mining boom in the near future.

BAKER CO. MINES.—Bedrock Democrat, June 29: Dr. Thibode, of this city, who had just returned from a visit to Cracker creek district, favored the Democrat reporter with the following notes: The La Bellevue, owned and operated by the Cabell Bros., the Dr. pronounces one among the finest ore producers that he has ever seen. The mine proper has an elevation of 7340 feet above sea level. Observations taken on the south side show a tunnel 700 feet long; vertical depth 225 feet. The ore body is 450 feet in length with an average width of 4 feet. Crosscut at the face shows 10 feet of ore and no foot wall. The hanging wall is porphyry; foot wall gneiss; 150 feet of hanging wall is almost perpendicular and foot wall nearly flat. On north side, tunnel on ledge is in 175 feet, winze 55 feet from level; ore between walls, 4 feet; pay ore, 2 feet; distance between tunnels, 1000 feet. On this side the ledge can be tapped at the depth of 1500 feet. There is on the dump 100 tons of shipping ore, averaging from \$350 to \$400, and from 700 to 800 tons of ore averaging between \$75 and \$150. The Wide West, owned by Messrs. Flaherty, Lucas and Garrison, is another property that bids fair to some day create a stir in mining circles. Tunnel, 500 feet; crosscut, 350 feet; vertical depth, 140 feet below upper tunnel. Upper tunnel is 100 feet long; crosscut, 80 feet; vertical depth, 80 feet; ledge in upper tunnel, 4 to 5 feet; lower tunnel, 5 to 6 feet; can be tapped 500 feet deeper by tunnel.

BAKER COUNTY MINES.—Bedrock Democrat, July 7: It is again gratifying to us to be able to note the rapid strides made in the development of mines and sales made in Baker county. Our county records to-day show the fact that another great mining sale has been consummated. Messrs. Henry and Erwin Cable yesterday transferred the first extension south of the great Eureka and Excelsior mines on Cracker creek, known as the Columbia, to an Eastern syndicate for a handsome figure. This mine was bonded on the 28th day of May by H. Stevenson of Salt Lake City, who has succeeded in selling it to men who, ere long, will have a mill on the mine turning out gold bars. Mr. J. E. Meacham of Caldwell, Idaho, an old-time mining superintendent, has taken charge of the mine as foreman, and will push the work vigorously for his company. The Cable Bros. have been working mines in Baker county for the last 15 years, and are experienced miners. They also own the great California mine, in the Cable Cove, which they now expect to develop, and are perfectly assured that they can make as large a mine of this as there is in the State. They now have 1000 feet of tunnel on the mine, exposing the ore vein in three places from which they have shipped rich ore to Denver and San Francisco, and have made considerable money in this way. There is also some rich placer ground in the district which has been located.

UTAH.

REVIEW.—Salt Lake Tribune, July 7: The week has seen the close of the half-year with a rather diminished metal production. The receipts in this city of bullion, excluding all ores, for the six months past were as follows, as per current reports: January, \$327,141.43; February, \$285,687.79; March, \$283,203.98; April, \$224,019.60; May, \$385,735.14; June, \$333,899.42; total, \$1,839,747.36. Several operations which make no current reports are necessarily not carried in the above. The slight rise in the price of lead has continued to help throughout the week, and the receipts of ore have been good. For the week ending July 4th, inclusive (really the 3d, the 4th being a holiday), five days, the receipts of ore were to the value of \$61,236.49; of bullion, \$93,497.23; total, \$154,733.72. For the previous week the receipts were \$199,654.18, of which \$103,217.27 was bullion and \$96,436.91 was ore. The Ontario product for the week was \$20,568.47 from ore sales, and of bullion 7835.12 fine ounces. For June the Ontario product was \$77,614.85 from ore sales, and of bullion, 104,977.39 fine ounces. The Daly output for the week was of bullion, 14,285.94 fine ounces of bullion and \$7688.92 from ore sales. Fine bar receipts for the week were to the value of \$52,760.30; gold bars, \$335.03; base bullion, \$17,050. The product of the Hanauer smelter for the week was \$11,180 in bullion; of the Germania, \$9155.82. Ore receipts in this city for the week were \$41,580.85 by Wells, Fargo & Co., \$14,500 by McCormick & Co. and \$5155.64 by T. R. Jones & Co.

About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first in payment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$90 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawing or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings oftentimes prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 28 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily when distant agents are employed is wasted in preliminary writing back and forth.

The happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording thus the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the inventor to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the inventor is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$1 to \$25. The Government fee is \$9 additional. To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

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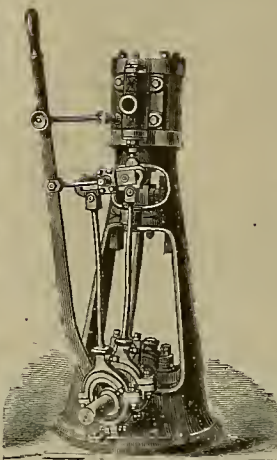
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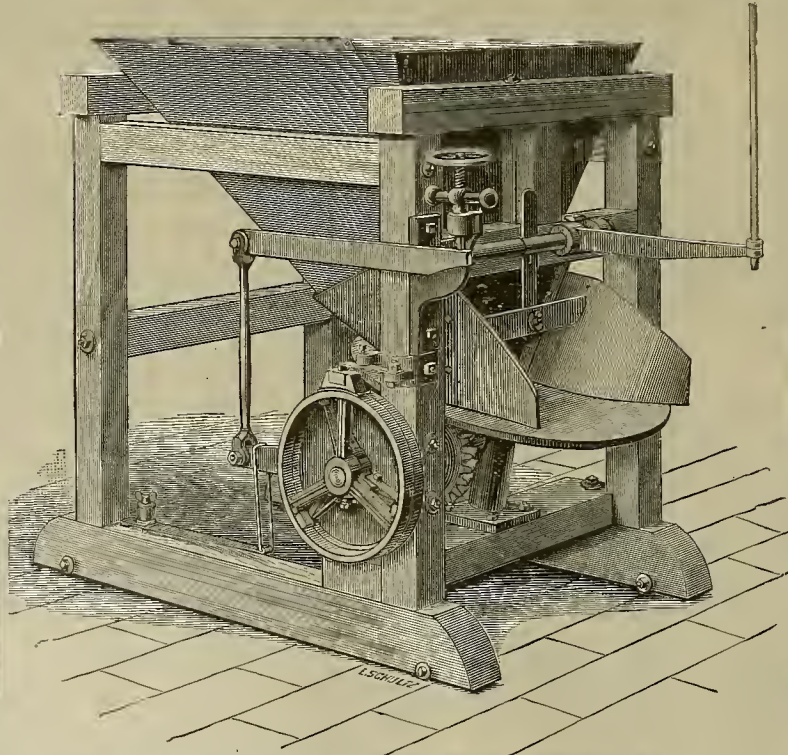
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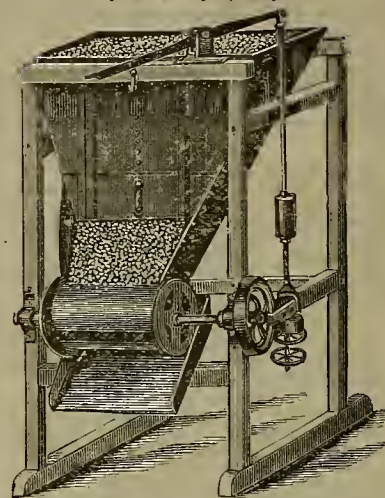
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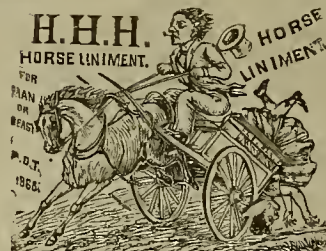
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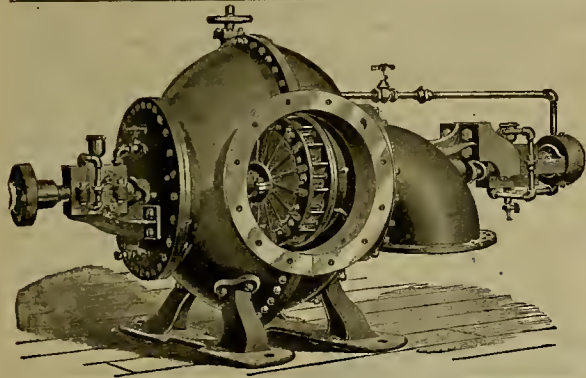
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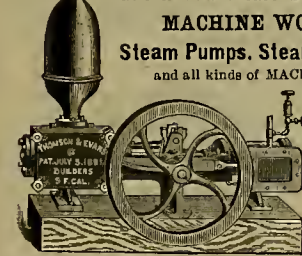
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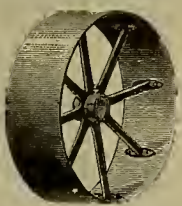


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Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JULY 3, 1888.

- 385,401.—WINDMILL—F. Boceard, Oakland, Cal.
385,500.—CAR COUPLING—S. Byrne, Brown's Valley, Cal.
385,600.—HYDRAULIC WELL-BORING MACHINE—G. W. Durbrow, Los Angeles, Cal.
385,346.—BILLIARD-TABLE—W. P. Flint, Marysville, Cal.
385,551.—ORE CONCENTRATOR—G. F. Gould, Grass Valley, Cal.
385,457.—STUMP EXTRACTOR—A. C. Hall, Cedar Mill, Ogn.
385,458.—DYNAMO-ELECTRIC MACHINE—A. Harding, Oakland, Cal.
385,460.—HYDRAULIC STEP—F. G. Hesse, Oakland, Cal.
385,516.—SPIRIT LEVEL—J. C. Hutton, Corvallis, Ogn.
385,466.—FENCE—D. B. Matlock, San Jose, Cal.
385,467.—FENCE—D. B. Matlock, San Jose, Cal.
385,470.—HAY STACKER—D. McRae, Umatilla, Ogn.
385,473.—HARMONICA HOLDER—W. Mulholland, Portland, Ogn.
385,423.—INSECTICIDE—M. Ongerth, Alameda, Cal.
385,372.—CARPET STRETCHER—S. S. Pearl, Halsey, Ogn.
385,431.—SLIDE VALVE—W. J. Thomas, Sausalito, Cal.
385,486.—LAMP BRACKET—A. Tharber, S. F.
385,389.—DEVICE FOR FUMIGATING TREES—L. H. Hius, San Gabriel, Cal.
385,653.—NOZZLE—Benj. Wright, Los Gatos, Cal.
385,495.—COMMODE—W. R. Wythe, Santa Barbara, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DYNAMO-ELECTRIC MACHINE.—Angust Harding, Oakland. No. 385,458. Dated July 3, 1888. The object of this invention is to provide an improved and convenient construction of the frame of the revolving armature and of the commutator sections, so that the parts may be easily separated or assembled. The different parts of the armature are perfectly and completely separated from each other and the commutator, by its construction, overcomes the common difficulty of short-circuiting.

LAMP BRACKET.—Alfred Tharber, S. F. No. 385,486. Dated July 3, 1888. This bracket for supporting lamps consists of a pair of semi-circular jaws, the outer ends of which are made to receive and hold the lamp body, while the inner ends are hinged together with a peculiar arrangement of the box within which the inner ends are contained and the spring by which the jaws are closed. By the construction devised all the parts may be put together without the use of the screws, and are very easily adjusted or taken apart whenever desired. By extending the rear portion of the jaws behind the pivot point within the case they serve to steady the jaws and prevent them from swinging from side to side.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Iron Mountain, July 7, \$16,000; Riley & Bites, 7, \$4,000; Uncle Sam, 7, \$5,000; Con. California and Virginia, 7, \$92,203; El Dorado Tunnel (for June), \$16,026; Savage, 7, \$34,550; Hale and Norcross, 7, \$155,000; Con. California and Virginia, 10, \$68,506—total for June, \$405,834. Shipment of Eureka Con., quoted in PRESS as \$4000 June 30th, was really \$16,000. Germania, July 3, \$1496; Hanauer, 3, \$3900; Queen of the Hills, 3, \$1100; Silver Reef, Utah (for June), \$21,517; Germania, 4, \$1340; Hanauer, 4, \$1880.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Sampling Works for Sale.

The works are situated on A. & P. R. R., Calico Mining District, Daguerre, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Platform Scales, Mill Scales, Assaying outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPIE & CHILDS, 123 California street, San Francisco.

Mining Share Market.

Notwithstanding the favorable outlook of the Comstock mines, the shares in the market show rather a decline than otherwise. The more hollowness the mines turn out the lower shares go. While ore which promises many more dividends is known to be in sight, yet the rapid decrease of volume of water in the Carson river forebodes a decrease in milling facilities and a consequent liability of assessments.

According to the monthly financial statements, the following companies have cash on hand: Alpha, \$14,307.48; Andes, \$14,626.82; Belcher, \$6879.66; Bulwer, \$19,048.88; Ballion, \$9738.32; Bodie, \$42,053.31; Bello Isle, \$8148.54; Crown Point, \$16,027; Con. California and Virginia, \$172,932.93 in cash and \$178,392.61 in unsold bullion, and about \$165,000 more in bullion to arrive; Crocker, \$15,270.85; Con. Imperial, \$4229.99; Dudley, \$489.16; Exchequer, \$10,522.56; Found Treasury, \$266.51; Independence, \$4835.80; Julia, \$1524.88; Mexicon, \$7130.63; Mono, \$18,625.24; Navajo, \$714.05; North Belle Isle, \$30,087.07; Ophir, \$2221.35; Occidental, \$8181.51; Pondera, \$150; Peerless, \$18,867.01; Sierra Nevada, \$3537.25; Syndicate, \$9853.89; Standard, \$42,651.92; Utah, \$17,606.33; Weldon, \$4326.30.

The following companies have an indebtedness: Best and Belcher, \$5123.89; Chollar, \$46,555.48; Commonwealth, \$11,761.03; Del Monte, \$3701.41; Gould and Curry, \$8096.64; Grand Prize, \$30,182.35; Locomotive, \$6107.41; Nevada Queen, \$28,381.75; North Commonwealth, \$9036.42; Potosi, \$55,570.49; Peer, \$1643.07; Savage, \$46,937.40; Seg. Belcher, \$28,719.63.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

AUTO-PNEUMATIC CAR MOTOR CO., July 9. Capital stock, \$1,000,000. Directors—R. H. Marchant, A. A. Hibbard, W. H. H. Graves, Chas. Hadenfeldt and John C. Reud.

CALIFORNIA BITUMINOUS BLOCK MANUFACTURING CO., July 9. Capital stock, \$200,000. Directors—H. Dutard, A. Halsey, M. B. Pond, W. C. Watson and A. Judson.

VIRGINIA & GOLD HILL ELECTRIC LIGHT CO., July 9. Capital stock, \$250,000. Directors—W. E. Sell, C. T. Bridges, N. D. Anderson, Chas. S. Wheeler and A. W. Riss, Jr.

TUSCARORA WATER CO., July 9. Location, Tuscarora District, Elko Co., Nev. Capital stock, \$500,000. Directors—Thos. Ball, Daniel Meyer, John F. Casswell, P. C. Hyman and C. B. below.

PORTLAND MINING CO. (OREGON), July 7. Object, development of mines in Oregon and Idaho. The company owns four mines on Beaver creek, Coeur d'Alene, the Silver Tip, Sitting Bull, Red Dragon and Mule Deer. Capital stock, \$5,000,000. Directors—John C. Davenport, J. H. Smith, P. O. Kaufman, J. P. Kohler, John Markle, G. B. Markle, Jr., W. H. Sherman and O. F. Paxton.

Appreciative.

The MINING AND SCIENTIFIC PRESS of June 23d is a 32-page edition and devoted mainly to an exhaustive and intelligent description of the Lick Observatory at Mt. Hamilton. A perusal of this issue of the PRESS will repay those who are interested in matters telescopic, and also those who wish to keep posted on California's progress as an enterprising State.—*North San Juan Times.*

GOVERNMENT BUILDINGS.

WELLINGTON, June 3, 1888.

EDITORS PRESS.—I have to inform you that having received no copies of the MINING AND SCIENTIFIC PRESS by the last mail, I feel uneasy, as I have each volume bound as it comes out, and therefore do not wish to lose any of the numbers. I look upon your paper as the most valuable one that comes into this colony for the mining class, and therefore regret the temporary stoppage very much.

Yours faithfully,
HENRY A. GORDON,
Inspecting Engineer, Mines Dep't, New Zealand.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, July 12, 1888.

ANTIMONY—French Star.....	4 @ 93
BORAX—Refined.....	7 @
Powdered.....	7 @
Concentrated.....	6 @
COPPER—	
Bolt.....	26 @
Sheeting.....	26 @
Ingot.....	26 @
Fire Box Sheets.....	26 @
IRON—Glenbrook ton.....	28 @ 50
Edginton, ton.....	27 @
American Soft, No. 1, ton.....	31 @
Oregon Pig, ton.....	21 @ 23 00
Olay Lane White.....	22 @ 00
Shot, No. 1.....	22 @ 00
Bar Iron (base price) 1/2 lb.....	21 @
LEAD—Pig.....	6 @ 00
Bar.....	5 @ 25
Sheet.....	8 @
Shot, discount 10% on 500 bag.....	1 @ 50
Buck, 3/4 bag.....	17 @
Oiled, do.....	1 @ 50
STEEL—English, lb.....	16 @ 20
Black Diamond tool.....	10 @ 16
Pick and Hammer.....	8 @ 10
Machinery.....	4 @ 6
Tool Chalk.....	4 @ 4
TRENCHING—Coke.....	6 @ 75
Charcoal.....	6 @ 75
SILVER—By the flask.....	38 @ 40 00
Flasks, new.....	1 @ 00
Flasks, old.....	85 @

FORTY ONE mining companies on the Comstock paid out in wages last month \$257,999.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M Co.	Nevada.	40.	25, June 5, July 10.	July 31, L. Osborn.	339 Montgomery St.
Bodie Tunnel M Co.	California.	15.	25, June 5, July 10.	July 31, C. C. Harvey.	333 California St.
Baltimore M Co.	Nevada.	2.	25, June 30, Aug. 1.	Aug. 12, W. V. Turner.	402 Montgomery St.
Challenge Con M Co.	Nevada.	4.	50, May 28, June 29.	July 18, C. L. McCoy.	329 Pine St.
California State Co.	California.	1.	10, Apr. 18, May 24.	June 25, J. O. Hanson.	10 California St.
Diana G & S M Co.	Nevada.	7.	10, June 8, July 10.	July 31, J. W. Pew.	310 Pine St.
Michael M Co.	California.	3.	01, June 15, July 15.	July 30, N. A. Eldred.	1833 California St.
Gould & Curry S M Co.	Nevada.	53.	50, June 22, July 26.	Aug. 16, A. K. Durbrow.	303 Montgomery St.
Gray Eagle M Co.	California.	5.	05, July 7, Aug. 11.	Aug. 31, T. Wetzel.	322 Montgomery St.
Live Oak Drift G M Co.	California.	9.	05, June 13, July 17.	Aug. 6, J. Morizio.	328 Montgomery St.
Eye M Co.	Nevada.	1.	05, May 25, July 5.	July 24, W. J. Dorlan.	401 California St.
Occidental Con M Co.	Nevada.	2.	20, May 29, July 2.	July 25, A. K. Durbrow.	309 Montgomery St.
Russell Reduction & M Co.	California.	2.	10, June 6, July 9.	July 31, J. Morizio.	328 Montgomery St.
Silver King M Co.	Arizona.	1.	50, June 22, July 30.	Aug. 23, J. Nash.	328 Montgomery St.
Summit M Co.	Calif. rita.	10.	10, June 8, July 11.	July 31, G. W. Session.	339 Montgomery St.
Seg Belcher & Mides Con M Co.	Nev.	1.	25, June 9, July 9.	July 30, E. B. Holmes.	309 Montgomery St.
Yuma M Co.	California.	3.	01, June 15, July 15.	July 30, J. Calver.	132 Fourth St.
Southern Coal & Clay Co.	Cal.	1.	10, May 26, June 26.	July 26, W. G. Mugal.	30 California St.
Scorpion M Co.	Nevada.	25.	10, May 16, June 22.	July 16, G. R. Spynker.	310 Pine St.
Sierra Nevada M Co.	Nevada.	82.	25, July 10, Aug. 14.	Sept. 1, E. L. Parker.	309 Montgomery St.
Union M Co.	California.	33.	05, July 5, Aug. 1.	Aug. 25, R. Hancock.	Grass Valley
Western Mineral Co.	California.	2.	1.00, June 21, July 31.	Aug. 20, A. Chemerant.	328 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Benton Con M Co.	Nevada.	V. R. Allen.	330 Pine St.	Annual.	July 27
Great Western M Co.	California.	A. Halsey.	328 Montgomery St.	Annual.	July 16
Lady Washington M Co.	Nevada.	W. H. Watson.	322 Montgomery St.	Annual.	July 25
Maryland M Co.	California.	L. V. Dorsey.	Grass Valley.	Annual.	Aug. 28
Mayflower Gravel Co.	California.	J. Morizio.	328 Montgomery St.	Special.	July 21
North Belle Isle M Co.	California.	J. W. Pew.	310 Pine St.	Annual.	July 27
Savage M Co.	Nevada.	E. B. Holmes.	309 Montgomery St.	Annual.	July 19
Tuscarora Con M Co.	Nevada.	J. J. Seavide.	309 Montgomery St.	Annual.	July 19
Union Con M Co.	Nevada.	J. M. Buttington.	303 California St.	Annual.	July 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	July 12
Confidence S M Co.	Nevada.	A. S. Groth.	306 Pine St.	2.00	July 10
Eureka Con M Co.	Nevada.	H. R. P. Hutton.	306 Pine St.	25	July 9
North Belle Isle M Co.	California.	J. W. Pew.	310 Pine St.	50	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	July 1
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50	July 9
Idaho M Co.	California.	J. W. Pew.	Grass Valley.	50	July 11
Pacific Borax, Salt & Soda Co.	California.	A. H. Lough.	230 Montgomery St.	1.00	July 10
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	15	July 12

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 21.	WEEK ENDING June 23.	WEEK ENDING June 25.	WEEK ENDING June 27.
Alpha.....	1.55	1.80	1.55	1.70
Alta.....	1.55	1.70	1.50	1.55
Andes.....	1.25	1.40	1.25	1.30
Argenta.....	1.50	1.51	1.15	1.10
Belcher.....	4.50	5.14	4.50	4.10
Bodie.....	2.30	2.49	2.25	2.40
Benton.....	1.00	1.00	1.00	1.00
Bodie Tunnel.....	1.00	1.00	1.00	1.00
Bulwer.....	1.00	1.00	1.00	1.00
Con. Y. & Cal.....	1.00	1.00	1.00	1.00
Challenge.....	4.50	4.80	4.00	4.00
Chollar.....	3.85	4.00	3.75	3.90
Crocker.....	2.00	2.17	2.00	2.10
Con. Imperial.....	4.50	5.50	4.50	4.50
Calcedonia.....	4.50	5.50	4.50	4.50
Con. Pacific.....	4.50	5.50	4.50	4.50
Crown Point.....	1.05	1.10	1.00	1.00
Del Monte.....	1.05	1.10	1.00	1.00
Central.....	1.00	1.00	1.00	1.00
Dudley.....	1.00	1.00	1.00	1.00
East B. & E.....	1.00	1.00	1.00	1.00
Eureka Con.....	1.20	1.30	1.10	1.20
Exchequer.....	1.00	1.00	1.00	1.00
Grand Prize.....	1.00	1.00	1.00	1.00
Gould & Curry.....	3.60	4.00	3.35	3.20
Hale & Norcross.....	7.75	7.75	7.50	7.50
Holmes.....	1.00	1.00	1.00	1.00
Independence.....	1.00	1.00	1.00	1.00
Iowa.....	1.00	1.00	1.00	1.00
Julia.....	1.00	1.00	1.00	1.00
Justice.....	1.05	1.10	1.00	1.00
Kentucky.....	1.00	1.00	1.00	1.00
Lady Wash.....	1.00	1.00	1.00	1.00
Martin White.....	1.45	1.60	1.40	1.50
Mono.....	1.15	1.40	1.15	1.30
Mexican.....	1.15	1.40	1.15	1.30
Northern Belle.....	1.00	1.00	1.00	1.00
Navajo.....	1.00	1.00	1.00	1.00
North Belle Isle.....	3.10	3.25	3.20	3.40
Niagara.....	1.00	1.00	1.00	1.00
Ophir.....	1.15	1.45	1.10	1.30
Overman.....	1.00	1.00	1.00	1.00
Potosi.....	1.00	1.00	1.00	1.00
Peerless.....	2.25	2.40	2.10	2.20
Peer.....	1.00	1.00	1.00	1.00
P. Sheridan.....	1.00	1.00	1.00	1.00
S. B. & M.....	1.00	1.00	1.00	1.00
Sierra Nevada.....	3.90	4.25	3.60	3.75
Silver Hill.....	1.00	1.00	1.00	1.00
Silver King.....	1.00	1.00	1.00	1.00
Scorpion.....	1.00	1.00	1.00	1.00
Syndicate.....	1.00	1.00	1.00	1.00
Union Con.....	3.90	4.40	3.60	3.75
Utah.....	1.00	1.00	1.00	1.00
Yellow Jacket.....	1.00	1.00	1.00	1.00

Sales at San Francisco Stock Exchange.

THURSDAY, July 12, 1888.	270 Central.....	45c
200 Argenta.....	120 Gould & Curry.....	3.15
225 Alpha.....	300 Grand Prize.....	2.40
50 Alta.....	500 Hale & Norcross.....	7.75
600 Baltimore.....	100 Mono.....	1.65
150 B. & Belcher.....	200 North Belle Isle.....	3.80
50 Bullion.....	100 Nev. Queen.....	5.50
250 Bodie.....	100 Ophir.....	1.75
200 Bulwer.....	200 Sierra Nevada.....	4.25
100 Belle Isle.....	850 Occidental Con.....	1.75
120 Challenge.....	200 Savage.....	4.25
150 Con Va & Cal.....	870 S. B. & M.....	3.05
20 Crown Point.....	4.00 Sierra Nevada.....	1.40
400 Con. Imperial.....	520 Utah.....	1.40
30 Confidence.....	18 75 Union.....	3.70
100 Crocker.....	1.05 100 Yellow Jacket.....	4.80

REDUCTION WORKS are to be constructed at National City, San Diego county, and \$30,000 will be expended on the plant. The projectors claim they can handle \$10 ore, and will begin smelting Sept. 1st. They expect ore from Arizona, Lower California and San Diego county. The plant will be one of 50-ton capacity.

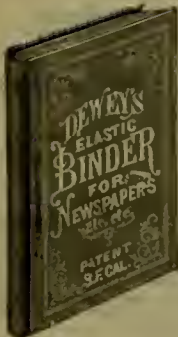
The steel cruiser Charlestown, the first man-of-war ever built in a private yard on this coast, will be launched from the Union Iron Works shipyard on Thursday, July 19th, at 7.30 P. M.

SILVER CITY, Sierra county, this State, is earning for itself the reputation of a very rich mining camp.

The Lick Observatory—Illustrated and Described.

THE MINING AND SCIENTIFIC PRESS of June 23, 1888, contains an elaborately illustrated description of the Lick Observatory and all its appliances. The information given is very full in all details. There is a history of the Observatory from its inception, and a biographical sketch of the founder, James Lick, with portrait.

The description of the buildings includes the main building, library, dome for the 12-inch equatorial, meridian circle-house, transit-house, photographic laboratory, dwelling-houses, water-supply, etc



A NEW PAPER BINDER
—A. T. Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the handiest, and very cheapest of all economical and practical file binders. Newspapers are quickly placed in it (as received) and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price (size of this paper, Harper's Weekly, and Scientific American), 75 cents; postpaid to purchasers of this paper, 50 cents. For sale at this office. Send for illustrated circular. Agents wanted.

J. A. JOHNSON, 307 Montgomery street (the Nevada Bank building) is the general agent of the Siles quartz machinery, and offers easy terms for introduction.

DIVIDEND NOTICE.

THE GERMAN SAVINGS AND LOAN
Society, 526 California St.—For the half-year ending June 30, 1888, a dividend has been declared at the rate of four and one-half (4½) per cent per annum on term deposits, and three and three-quarters (3¾) per cent per annum on ordinary deposits. Payable on and after Monday, July 2, 1888.

WM. HERRMANN, Secretary.

A. L. OTT,

Manufacturing Jeweler & Diamond Setter.
No. 13 TRINITY STREET.

Above Montgomery, bet. Bush and Sutter, San Francisco.

Designs and Estimates furnished on application.

Practical Treatise on Hydraulic Mining.

By AUG. J. BOWIE, Jr.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, such as nozzles, hurly-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tallings and dump; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, \$5, post-paid. For sale by Dewey & Co., Publishers, 252 Market St., San Francisco.

FOR SALE.

A half interest in a gold bearing quartz mine, situated at Mokelumne Hill, Calaveras County. Two shafts sunk 60 and 110 feet, respectively; also a level run at the bottom of the 110 foot shaft about 100 feet. The ore body averaged three feet strong, and varied from \$10 to \$20 per ton. A tunnel was since run 300 feet, and a ledge has been struck which is four feet in width. This ore will yield \$5 to \$6 per ton. It is only sixty feet from the surface. The object of selling the above-named interest is to obtain some responsible party, with means, to sink a shaft 300 feet, and run several drifts along the ledge. The present owners ceased operations for want of working capital. None but principals need apply. The party purchasing must commence operations within thirty days from date of signing contract and work continuously and systematically till the shaft is completed. It is patented property. Address,

ABRAM SHEAR.

No. 506 Battery St., San Francisco, Cal.

THE

American Railway Publishing Co.
NEW YORK and CHICAGO.

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The best advertising medium in their line in the world. Rates on application.

HORACE D. RANLETT,

Ores, Mining, and Commission,

420 Montgomery St., S. F.

BUSINESS MANAGER OF

UNION COPPER MINE, Calaveras Co.,
NEWTON COPPER MINE, Amador Co.

Correspondent as Agent for Smelters in London, Liverpool, New York, Boston and Baltimore.

Twenty years experience, in California, purchasing Gres and dealing in Mines.

Special attention given to management and sales of mines and purchase and shipment of copper produce

FOR SALE.

2 Triumph Concentrators.
1 New 12-inch, 35 H. P. Engine.
VERY CHEAP. Apply

130 Sansome St., room 12.

ELECTRIC DEVELOPMENT COMPANY.

Incandescent & Arc Electric Lights.

Electric Motors, Dynamos, Trams, Elevators, Signals and all kinds of Electrical Systems for lighting and transmission of power, either direct or with storage Batteries.

For Mines, Hoisting Works, Mills, Reduction Works,

Indoor and Outdoor Illumination of every kind. Gas, Oil and Candles superseded by the

EDISON INCANDESCENT LIGHT.

The only complete and satisfactory incandescent system. Lights require no attention and are under complete control. Over 500,000 lights in use in the United States. SELF-REGULATING ARC LIGHTS turn night into day and afford a means of working the whole 24 hours; invaluable to contractors and others to whom time is an object. Estimates and designs on application.

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Sydney, N. S. W.

PARKE & LACY,

21 and 23 Fremont Street,

SAN FRANCISCO, CAL.

—IMPORTERS AND MANUFACTURERS OF—

MACHINERY

ENGINES,

BOILERS,

STEAM

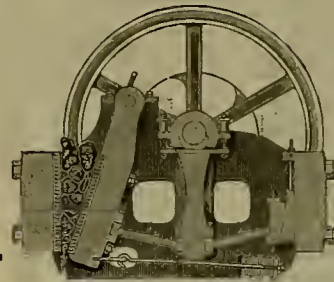
PUMPS.

ROCK

BREAKERS,

PULVERIZERS,

CONCENTRATORS.



GIANT ROCK BREAKER.

Westinghouse "Standard" and "Junior" Engines, Rock Drills and Air Compressors. Saw and Planing Mill Machinery, Machine Tools, Governors, Injectors, Oil Cups, and Lubricators.

BELTING, OILS and GENERAL SUPPLIES.

We are prepared to give estimates for Hoisting Works and Pumping Plants, Stamp Mills, Smelters and Concentrators.

THE RAND DRILL COMPANY, 23 Park Place, New York.

We are now so situated with our new works as to offer to the miners of the Pacific Coast small Air Compressing Plants at such prices that almost any small mine can afford to put in power drills if they have none in use.

By our new and patented systems (by which the duty or performance of drills is not reduced with use) it is no longer necessary to buy a Compressor of double capacity than the drills are expected to require, in order to keep up the supply of air necessary on account of the wear of drills and compressor.

In respect to capacity in speed of drilling, perhaps it is in order to say that in every authoritative contest for speed yet initiated, the Rand Drills have, without exception, been victorious. This fact, coupled with another important one, that the drills use much less air and cause less repairs, has won for them nearly all of the Eastern mining trade, which has kept their works always busy.

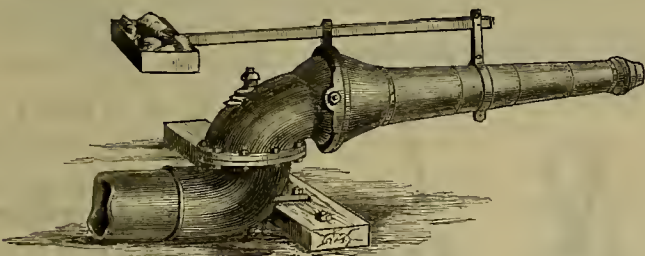
Since the reasons which formerly restrained us from the California market no longer exist, we are now in the field for the business.

SPECIAL ATTENTION is called to the latest designed sectional Compressor just built for the Batopilas mine in Mexico, and to the Compound Engine Compressor built for the Anaconda mine in Montana.

**ROCK DRILLS
AIR COMPRESSORS &
GENERAL MACHINERY FOR
MINING, TUNNELING,
QUARRY & RAILROAD WORK.**
RAND DRILL CO 23 PARK PLACE NEW YORK, N.Y.

Besides having the newest and lightest designed small drill plants, the Rand Drill Company, as is well known, has built, and is now building, the largest Compressor plants in this country, and has patterns for all sizes up to 40-inch diameter of cylinder.

IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

ELECTRIC POWER For MINE and MILL.

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N. S. KEITH,

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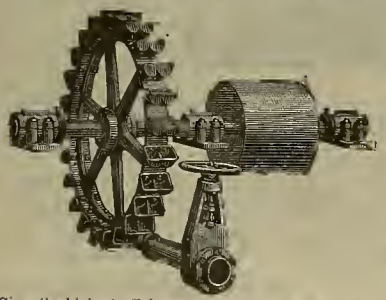
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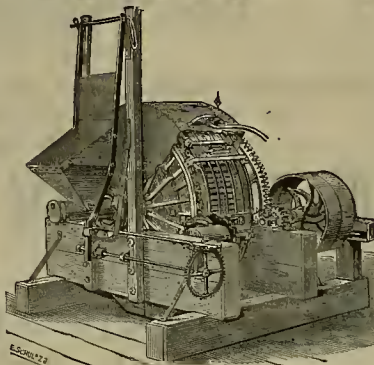
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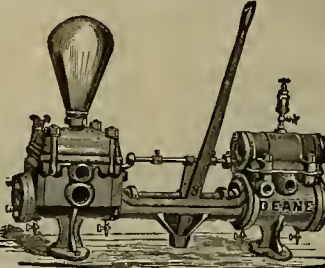
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NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

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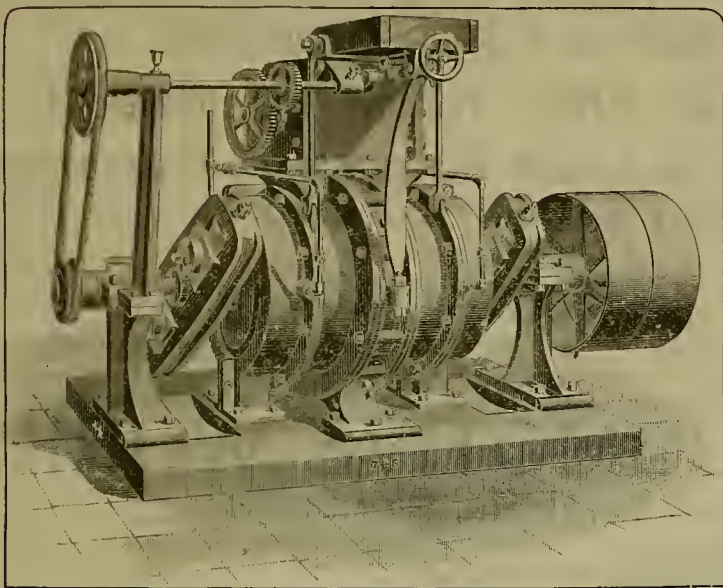
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Agent for **HOSKINS'**

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FRISBEE WET MILL. DOUBLE "ECONOMIC" STAMP MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity equal to 30 stamps, reducing two and a half to three tons per hour of hard quartz to 40 mesh.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh.

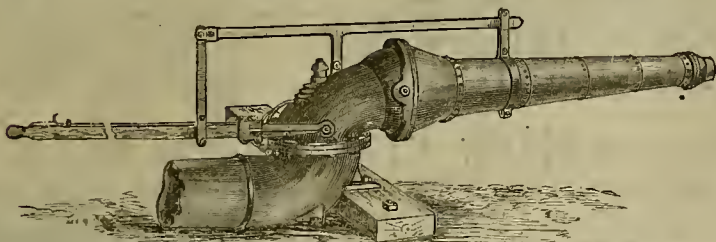
OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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IMPROVED FORM OF HYDRAULIC GIANTS.



The above cut illustrates the **IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS**, with lever attachment, which we manufacture. All similar styles are infringements upon this form, and a judgment stands of record to that effect, under a decision of Sawyer, Judge of the U.S. Circuit Court, in the case of Hendy and Fisher vs. R. Hoskin et al.

We also manufacture the **Single-Jointed Giants**.

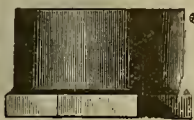
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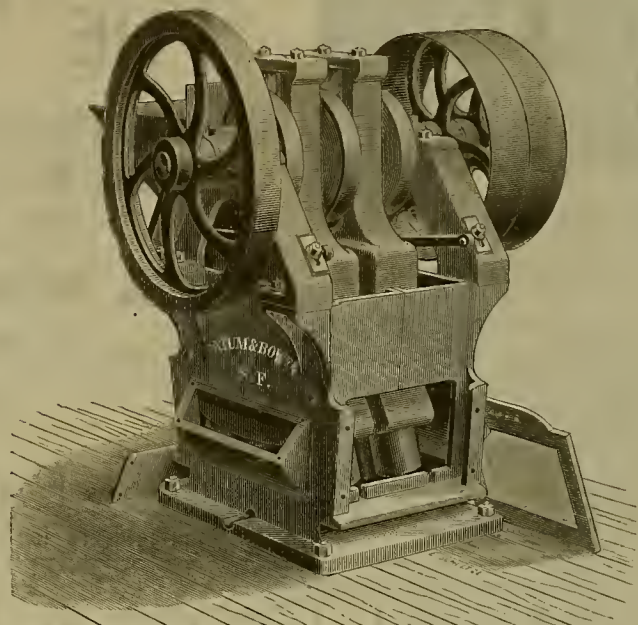
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ADAMANTINE SHOES AND DIES.—Guaranteed to prove better and cheaper than any others. Orders solicited, subject to above conditions.
H. D. MORRIS.



We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the rapidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in any other mill to do the same amount of work.

The Mortar has screens at both ends, giving ample discharge. There are no cams or tappets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

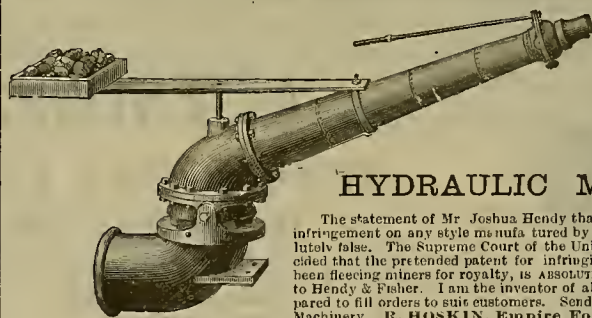
Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

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Manufacturers of Mining and Sawmill Machinery, Engines, Boilers, Etc.



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HYDRAULIC MACHINE.

The statement of Mr. Joshua Hendy that ANY STYLE of machine is infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, is ABSOLUTELY VOID, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. **R. HOSKIN, Empire Foundry, Marysville, Cal.**

HOISTING ENGINES FOR MINES.

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

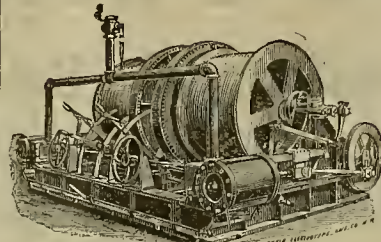
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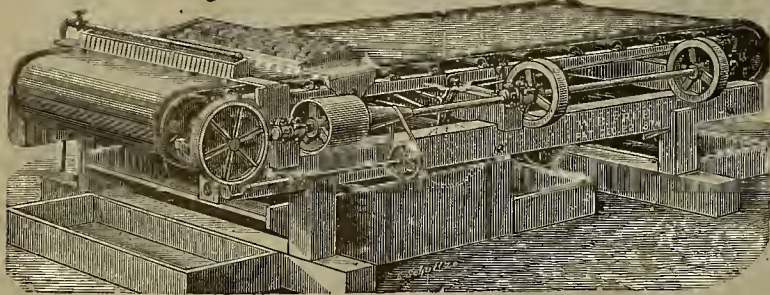
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**THE FRUE ORE CONCENTRATOR
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DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

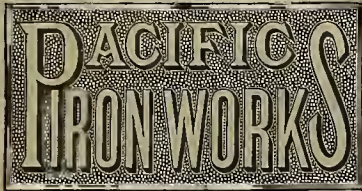
THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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1850. 1888.

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We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE HAZELTON BOILER

Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

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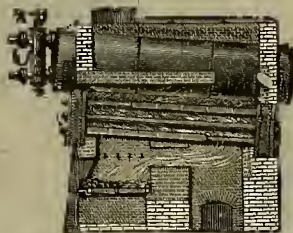
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60,000 Horse Power now in use.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works, Hueter Bros. & Co., California Jute Mills, and other places.

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QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAVING MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 60,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

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WILSON'S PATENT GAS-PRODUCER.

STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

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Builders of 120-stamp Gold Mill for the Alaska Mill and Mining Company; 60-stamp Mill for Quartz Mountain Mining Company.

Send for Circular and Price Lists.

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Silver-Plated Amalgamating Plates

For Saving Gold in QUARTZ, GRAVEL and PLACER MINING,

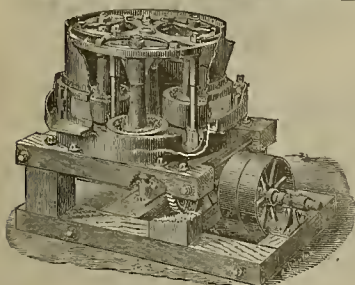
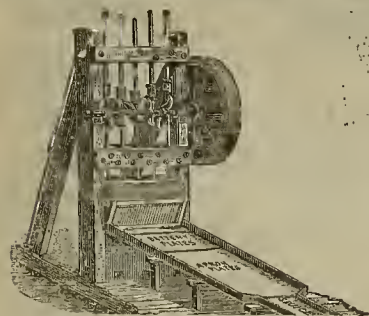
At reduced rates. Get our prices. Three thousand orders filled. Fifteen medals awarded. Our plates have proved the best, and far superior to others in weight of silver and durability. Old mining plates replated. These plates can also be purchased of JOHN TAYLOR & CO., cor. First and Mission Sts.

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NOTICE.—Our Silver Plated Plates have always proved as represented. We have been manufacturing them for 20 years, and use only the best Lake Superior Copper and Refined Silver. Comparing our plates with those of other manufacturers, after repeated tests, we can safely guarantee much better plates for the same money. Our plates are used by all the prominent mining men on the Pacific Coast. SEND FOR CIRCULAR.

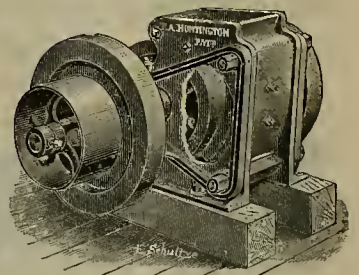


Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,
MANUFACTURER OF
**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,**
Mining Machinery of Every Description,
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
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SAN FRANCISCO, SATURDAY, JULY 21, 1888.

VOLUME LVI.
Number 3.

The Cruiser "Charleston."

A Government Vessel Built in California.

On this page is an engraving of the U. S. Cruiser "Charleston," as she will appear when completed. This ship is the first steel man-of-war ever built on this coast by private enterprise, and her launch occurs to-day (Thursday) from the yard of the Union Iron Works, at the Potrero. The hull is completed, but the vessel has yet to receive her propellers, armament and machinery. She is launched now in order

screws. The stem, stern-post, rudder and shaft tubes and brackets are of cast steel. The remainder of the vessel is of wrought or rolled steel. The outside plating is 7-16 to $\frac{1}{2}$ inch in thickness, the inner bottom plating $\frac{1}{4}$ to $\frac{5}{16}$ of an inch, the shear strokes $\frac{3}{8}$ to $\frac{7}{8}$ inch.

The conning tower is on the forward ridge, and is two inches thick on the sides with a three-quarter inch top.

All the steel used in the construction of the hull and all for the engines (except the crank and line shafts, which were made by Krupp, at

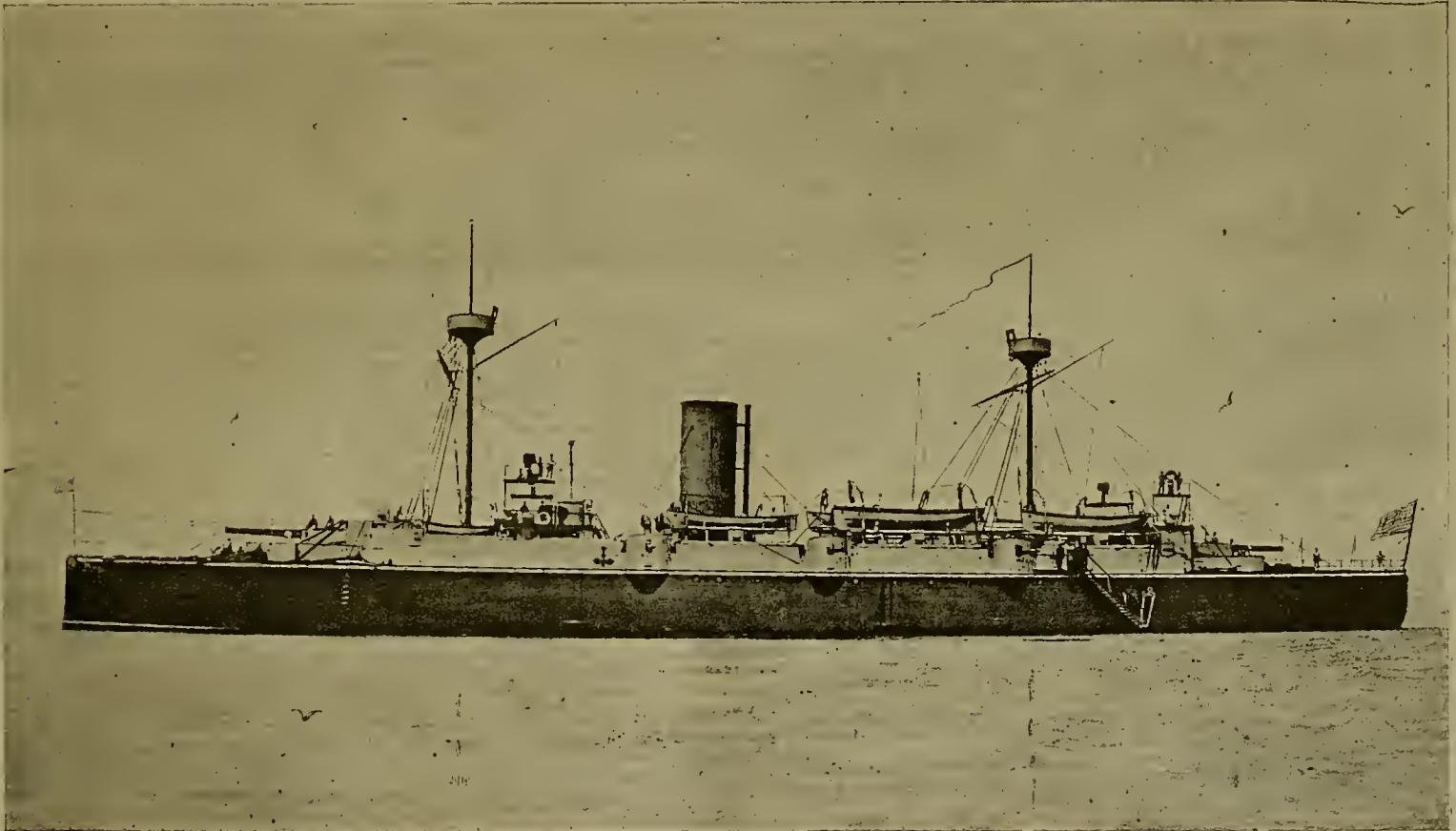
The propellers are 14 feet diameter, made entirely of manganese bronze. The hubs are held to the shaft by big nuts, over which screw pointed bronze caps, giving a very finished appearance. Three blades are strongly secured to each hub in such a manner that the required pitch, 18 $\frac{1}{2}$ feet, may be changed if necessary, to any desirable pitch.

Her boilers and machinery will be placed in the lower or protected deck, below the water-line. The other two decks will be used as store-rooms, sleeping-rooms and the like.

one each. Every room in the vessel will be ventilated by artificial means.

The armament will consist of two eight-inch breech-loading rifles, one forward and one aft; weight, 28,000 pounds. The charge of powder will be 125 pounds, the shell will be 250 pounds and the range about eight and one-half miles. The penetration at 1000 yards is 15.1 inches, wrought iron; the penetration at 2000 yards is 13.6 inches, wrought iron.

Six six-inch, mounted in broadside; weight, 11,000 pounds; charge, 50 pounds; shell, 100



THE CRUISER CHARLESTON—THE FIRST STEEL MAN-OF-WAR BUILT IN CALIFORNIA.

to make room for another cruiser for which the same works have a contract.

This fine specimen of naval architecture is no experiment, two vessels of similar design having been previously constructed. One of them was the Chilean cruiser Esmeralda, the other the Naniwa Kan, built for the Japanese Government. This latter ship was used for a guide when the Charleston was designed. The contract for building the Charleston was signed December 26, 1886, and the cost of the hull and machinery was to be \$1,017,000. Owing to delay in obtaining the steel plates, the keel plate was not laid until August 27th of last year, though much of the steel angles, bars, etc., were prepared here in readiness for the work.

The following are the principal dimensions of the Charleston: Length over all, 320 feet; length between perpendiculars, 300 feet; extreme breadth, 46 feet; depth, 34 feet; draught of water forward, 17 $\frac{1}{2}$ feet, aft, 19 $\frac{1}{2}$ feet; mean draught, 18 $\frac{1}{2}$ feet; displacement, 3730 tons. She is built entirely of steel and has twin

Essen,) is of domestic manufacture, known as mild steel, made by the open-hearth process.

The vessel has a steel ram projecting six feet ahead of the perpendicular line of the bow. The stern weighs 13,000 pounds, and the steel stern-post weighs 11,000 pounds, and were both made in this State.

There are two main engines; they are compound and direct-acting, with a high-pressure cylinder of 44 inches in diameter and a low-pressure cylinder of 85 inches in diameter, both cylinders being inclined a little from the horizontal. The engines weigh about 50 tons apiece, and are supported by a rigid foundation built up from the inner bottom and calculated to reduce vibration to a minimum. The stroke of the pistons is 36 inches, and the maximum power is to be obtained with 90 pounds of steam in the boilers.

There are six main boilers, three in either boiler-room; those in the forward room are 11 feet in diameter and 19 feet 3 inches long; those in the after, 11 feet 6 inches in diameter and of the same length.

For the greater part of the ship's length, running parallel with the bottom plating up to three feet above the bilge-keels, is the inner bottom; between the two bottoms is a space varying from 36 inches deep in the middle to 27 inches at the sides, perfectly water-tight and subdivided into 11 water-tight compartments, to which entrance, if necessary, is had through manholes closed with brass doors. By a system of piping, as many of these compartments as desired may be flooded with water, thereby sinking the ship further below the surface.

There are 29 different water-tight compartments on the protective deck, which is also made water-tight, so that if in action water is let into one, or if several of them are knocked into one, the ship will still float.

The Charleston will be lighted throughout with incandescent lamps. Two independent dynamos, with a light-producing capacity of 3200 candle-power each, will be provided, one to be used in case of accident to the other. There will be about 400 lights, even the Gatling gun stations at the mastsheads being fitted with

pounds; penetration at 1000 yards, 10.8 inches, wrought iron.

Secondary battery—Two Gatling guns; four six-pounders, Hotchkiss rapid-firing guns, penetration, steel plate at point blank, 5.1 inches; two three-pounders, Hotchkiss rapid-firing guns, three inches; one one-pounder, Hotchkiss rapid-firing guns, 2.87 inches; four 37 mm. (1.45 inches), revolver cannon, projectile weighs 1.87 pounds.

The work done on this vessel by the Union Iron Works is greatly to their credit and must redound to the benefit of the industrial interests of California. It was not thought that facilities for such work existed on this coast until the Union Iron Works put in their bid. The proprietors of these works have shown in a practical manner that we are able to compete with the East in an important branch of industry. It is expected that in about five months the Charleston will be ready to make her trial trip. As the launch occurs after we go to press, we can give no description of it until next week.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Debris Dams.

EDITORS PRESS:—Touching the subject of debris dams, it may be that some of your readers do not quite understand this proposition.

It is conceded that not the coarse sand and finer gravel, and much less the coarse gravel, which scarcely reaches the rivers in any case, but the fine silt and mud (slicens), constitutes the chiefly objectionable element of mine debris. It is also conceded that a reservoir to retain the slicens, so that the water may become as clear as is required, would of necessity be of very large area and of great depth, so that it would have the dangerous elements of a water reservoir; that is to say, an immense volume of water and heavy pressure on the dam. It may also be allowed that an extensive accumulation of any kind of loose material in the channel of a mountain river would be objectionable because, although such accumulation might be confined to the coarser sand and gravel, which may be retained without any great or dangerous depth of water, and therefore without great hydraulic pressure on the dam, by the simple expedient of raising the dam and the outlet only as required from time to time, allowing the muddy water and suspended silt to pass off; yet, in the channel of a river which is exposed to heavy freshets, as are all of our mountain rivers, the occurrence of such a freshet, which no artificial outlet could accommodate, would endanger the integrity of any dam which it would be feasible to build for the purpose. If the dam should give way, although the result would not be such a deluge as would occur in the case of a large reservoir of water, yet the accumulated sand and gravel would be "ground-sliced" out by the continued torrent, and the object and purpose of the dam would be defeated.

But the idea of sensible thinkers on this subject is, neither to retain all the slicens by means of artificial reservoirs, nor to obstruct the channels of mountain rivers by retaining the coarser material therein.

The plan which may be feasible, which is surely possible, in some cases at least, and which therefore ought to be investigated by competent engineers, is to conduct the water and tailings into such natural or artificial (as worked-out hydraulic mines, etc.) hollows, ravines or basins as may be adapted to the purpose by means of dams and outlets to be raised periodically as required, and which are not exposed to freshets of sufficient force to endanger the dams; there to retain the coarser sand and the gravel, and then to conduct the overflow, carrying the silt, etc., by means of canals and flumes when required to the tule basins or other low-lying lands which would be benefited by an accretion of from 2 to 20 or more feet of material which experience has proved to form an excellent quality of arable land. In some cases it might be necessary to throw up levees on one or more sides of such low tracts, but this would not be required for the tule bottoms.

Any flumes which might be needed for the conveyance of the coarser material to a place of deposit would, if properly constructed, pay for themselves by retaining a quantity of gold which the continued washing would release from imperfectly disintegrated cement and gravel, and the attrition of auriferous stones.

There in the valleys are immense tracts of veritable, not merely technical, "swamps and overflowed land," and other large areas of nearly barren mesa, to which the advent of this mud-laden water would be as the annual overflow of the Nile to the otherwise barren regions through which that river flows; and here are mountains of earth, with money in their pockets, so to speak, to reward the enterprise which shall put them where they will do the most good, and with untold and incalculable potency for productivity, locked in their "molecular constitution," which only awaits the advent of a favorable environment to develop a fertility equal to that of the river bottoms, which are nothing but the slicens of Nature's hydraulics.

Here is an engineering proposition with pay at both ends, or at least with probable profit at the first and a certain remuneration at the last. And there sits supreme authority (!) and from out the folds of the judicial ermine solemnly proclaims an impossible impossibility!

I say it is impossible that it should be impossible to do this thing!

The engineers of England and France stand ready to bridge or tunnel the British channel. De Lesseps is cutting the western hemisphere in twain; the Suez canal, once declared "impossible," has long been an accomplished fact. Hundreds of triumphs of engineering skill attest the possibility of impossibilities; and shall American skill, courage and capital recoil from a simple question of ditching?

Whether such a work would pay or not is not the present question. I believe it would, in the long run, if not immediately, but I opine it is not within the province of the courts to pronounce on this matter, which concerns rather those who might be willing to take the risk, and I feel sure that, if not we, our posterity will find some way in which to reconcile the seemingly antagonistic interests of the mountains and the valleys.

July, 1888.

C. H. AARON.

Amador County Mines.

The Zeile Mine.

EDITORS PRESS:—This mine keeps constantly in motion and is the life of Jackson, employing a large force of men. The mill of 40 stamps puts through about 100 to 125 tons of ore per day. Some seven or eight years ago when the present superintendent came in there this mine was largely in debt and this ore being of so low a grade the outlook was almost discouraging enough to close down the works. But since then Mr. Deters has not only made it pay, but the indebtedness was all paid up very shortly, and now there can be no question as to its future permanency.

The Amador Gold-Mining Company, Between Butte City and Jackson, has arranged for and is just about starting to build a 40-stamp mill. The contract has been given out and this company will, ere long, be another to add to the wealth of not only the county but also the State, as they have some five ledges, all of which have been thoroughly prospected, justifying them in the large undertaking they have entered upon. This will give employment to a large number of men and materially add to the output of gold for this district. The property, we believe, is owned principally by Jno. J. Minear.

The Amador Reduction Works At Sutter Creek are now in full blast, receiving sulphurets from not only this county but from various other adjoining counties for reduction and treatment. They have a complete plant quite equal to the best. This company also purchases sulphurets from parties who prefer to sell by sample and realize ready cash.

The Boettner Mill and Mining Company. This company having suspended operations for a long time past on account of litigation, is, we understand, on the eve of an adjustment that will shortly, it is to be hoped, place them in position to again come to the front and soon be numbered among the gold-producers of the county.

The Satter Creek foundry is in full operation, turning out mining machinery for the mines throughout this and the adjoining counties.

The Spring Hill mine, under the able management of John R. Tregloan, is in full running order, 30 stamps continuously going, water abundant, and everything about in a prosperous condition. The ore, like most on the lead, is of low grade.

The Keystone mine and mill is running the full complement of stamps, 40 in number, and employing about 100 men. This is one of the permanent mines of the county, and under the management of Mr. O. C. Hernet as superintendent.

The Wildman Mine At Sutter Creek is now down about 500 feet. They have just put in a new pump, and are running ten stamps. The ore pays from about \$2.50 to \$10 per ton. It is the intention of the owners, very shortly, to erect an additional ten stamps, making 20 in all. They have excellent hoisting works, and have a water pressure of 450 feet for power purposes.

The Bunker Hill Mine, Just below Amador City, with Mr. Parker as superintendent, is getting out large quantities of ore, and transporting it to mill some distance below, requiring two mules to bring back return cars, which hold about three tons each when full. This ledge is a very large one, and although of very low grade, yet leaves a large margin for profit over and above expenses. It is surprising how cheaply ores can be mined and milled with proper facilities for handling. It is now well understood among practical mining and millmen that where large bodies of regular pay ore occur, with advantageous handling and sufficient milling facilities, ores that pay only as low as \$1 per ton can be mined and milled to a profit, as not only this but other counties adjacent have practically demonstrated.

The Mahoney Mine Is now lying idle, although it is considered a most excellent property. The three brothers Mahoney all took out a fortune each from this mine, and it was perhaps a misfortune that they did, for it led them into dissipation, which has ended the days of all of them, the last surviving one having been hurried only a few days ago.

The Guver Mine and Mill Of 40 stamps is pounding out rock constantly, which is paying from \$9 to \$13 per ton. This, considering the size of the ledge, is an exceedingly valuable mine. We hear that a purchaser made an offer for it fully equal to the price asked only a short time since, but the owners refused to sell, thinking its value increased much more than double. The

Pinto Mine, Near Drytown, has shut down on account of want of water, but we hear they will soon add 20 stamps to the mill, making 40 in all. They will also arrange to bring in a water supply for all purposes required.

Plymouth Mines and Mills. This pretty little mountain town, only a short time since so flourishing and lively, is now almost dead, the cause being the closing down of the Empire and Pacific mines and mills. This was caused by the fire in one of the mines some months ago, but which has been put out long ere this not only by flooding

with water, but also from the introduction of gases that would smother it.

Now, there seems to hang a mystery about the closing up, for there is no concealing the fact that the mines are most excellent paying properties and can and will continue to be so for an age to come. The question is in everybody's mouth: What does it mean? Yet none can answer; none can solve the problem. The universal dullness caused by this closing down is manifested everywhere around this vicinity, for money is scarce and credit is at a discount. The ranchers around have no money, nor can they support the town. What will be the outcome none can tell but the owners, and they won't.

This brings to memory the famous Sisson mine, only about four miles distant, owned also by one of the same parties. This property has lain idle for some few years past, yet everybody knows it is as good as any in the county, but the owner will not work it himself or let any one else.

The ditches and reservoirs have been permitted to go to ruin and become filled up and broken down, though they could have been utilized by ranchers for irrigating purposes, if no other. Yet all seems to have been permitted to go to destruction together, all of which is as mysterious as the other.

This shows the great importance of the mining industry of the State and the fostering of the same. Stoppage of the work means ruin to the district. Even when temporary, it takes a long time to recover from the effects, and is greatly to be deplored, under any circumstances.

W. A. K.

The Stewart Mining Bill.

The Proposed Changes in the Law.

In the last number of the PRESS we published a letter from Hon. W. M. Stewart of Nevada, in which he states that it is not probable that the mining bill will become a law at this session of Congress. In answer to our request he has sent us a complete copy of the bill as it passed the Senate. As the matter is of importance to miners, we here republish, from last week's PRESS, Senator Stewart's letter, and append the bill in full. It should be kept for reference by all interested in the subject.

UNITED STATES SENATE,

WASHINGTON, June 30, 1888.

Editor "Mining and Scientific Press"—DEAR SIR:—On my return from Chicago I found your favor of the 8th inst. Inclosed I send you a copy of the mining bill introduced by me as it passed the Senate. It is still pending in the House Committee on Mines and Mining. I do not know what action the committee proposes to take on it during the present session. It may be amended in some particulars. I have received many letters from mining men suggesting amendments to the bill, and I may submit some of them to the House Committee. A suggestion in a letter I have just received from Enreka, Nevada, seems worthy of consideration. It is to the following effect: If the same person, corporation or association own several claims which combined do not exceed 1500 feet in length by 600 feet in width, the owner may make a relocation of the same and obtain a patent therefor in one application, provided adverse rights are not affected thereby.

I have not pressed the bill in any haste; there is no difficulty in passing it when perfected. My anxiety has been, and still is, to have the bill when passed remedy the defects which have been discovered by experience under existing laws. Any suggestions, therefore, in regard to the bill are very welcome. Yours truly,

WM. M. STEWART.

A BILL

To amend Chapter six of Title thirty-two of the Revised Statutes, relating to mineral lands and mining resources.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section twenty-three hundred and nineteen of the Revised Statutes be amended by adding thereto the following:

"But no person shall acquire, by location or possession, more than one mining claim on the same vein, nor shall any person relocate a claim which he has previously located."

Sec. 2. That section twenty-three hundred and twenty-four of the Revised Statutes be amended so as to read:

"SEC. 2324. The miners of each mining district may make regulations, not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a certificate of entry has been issued therefor, not less than one hundred dollars' worth of labor shall be performed, or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year, for each one hundred feet in length along the vein until a certificate of entry has been issued therefor; and for each twenty acres of placer claims, and for each subdivision thereof, less than twenty acres, fifty dollars' worth of labor shall be performed or improvements made during each year until a certificate of entry

shall be issued therefor. The period within which the annual work required to be done by this section shall commence at twelve o'clock meridian on the first day of August of each year: Provided, That upon claims already located previous to the first day of March in any year the annual work shall be performed on such claim for that year prior to twelve o'clock meridian of the first day of August next succeeding. And the time for performing annual work on claims heretofore located is hereby extended to the first day of August at twelve o'clock meridian. When the labor required by this section shall have been performed or the improvements made, an affidavit shall be filed with the officer authorized to record deeds in the county in which the mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with these conditions, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: Provided, That the original locators, their heirs, assigns, or legal representatives, do not resume work upon the claim after such failure and before such location, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvement may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures, and such co-owner may relocate such individual interest in his own name. When a person or company has or may run a tunnel for the purposes of developing a lode, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode, and such person or company shall not be required to perform labor or make improvements on the surface of said lode in order to hold the same."

Sec. 3. That section twenty-three hundred and twenty-five of the Revised Statutes be amended by adding thereto the following:

"But no more than three thousand feet in length along the vein of claims located prior to the tenth day of May, eighteen hundred and seventy-two, and not more than one claim located after said date shall be included in the same application for a patent, and not more than one hundred and sixty acres of placer ground shall be included in the same application for a patent."

Sec. 4. That section twenty-three hundred and thirty-five of the Revised Statutes be amended so as to read:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in any State or Territory of the United States or in the District of Columbia, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the register and receiver of the land office. In cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken, under such regulations as the Commissioner of the General Land Office may prescribe."

Sec. 5. Amend section twenty-three hundred and thirty-eight of the Revised Statutes so as to read:

"SEC. 2338. As a condition of sale, each patent shall reserve the right of way through or over any mining claim for roads, ditches, canals, cuts and tunnels, for the purpose of working other mines: Provided, That any damages occasioned thereby shall be assessed and paid in the manner provided by the laws of the State or Territory in which such mine is situated for assessments and payments for land taken for public use under the right of eminent domain. And the rights and easements reserved under the provisions of this section in patents heretofore issued shall be regulated and made available as herein prescribed."

Quicksilver Ores in Mexico.

By the courtesy of the officials of the State Mining Bureau we are permitted to publish the appended letter from Jno. W. C. Maxwell. This gentleman has presented to the Bureau several interesting specimens of quicksilver ores, among which were two specimens of Livingstonite (a sulph-antimonide of mercury) from Mexico, and accompanied the same by the letter to the State Mineralogist, which we here publish:

Wm. Ireland, Jr., Esq., State Mineralogist of California, San Francisco.—DEAR SIR: The specimens of quicksilver ore herewith presented to the State Mining Bureau are selections from among a number of samples I had occasion to take recently in an examination of mines of this metal in the Republic of Mexico.

While but two of the specimens differ materially from the general character of ore of this metal produced by the mines of California, those from the mine of Santa Rosa, located on the line dividing the States of Mexico and Morelos, possess an especial value from a historic point of view. The mining literature of Mexico accredits this property with having been the first producer of quicksilver in that country, if not on this continent. Certain it is, however, that as early as the year 1718, it was in operation, for by a "Cedula" (an order of the Spanish sovereign) dated at San Lorenzo, July 5th of that year, directed to the "presidente and oydorea of the audiencia of the City of Mexico, in the province of New Spain," D. Juan Joseph de Veitia was commanded to "close and destroy the works and mines or

THE St. Joe Co., Missouri, is turning out lead at the rate of 14,000 tons per annum.

4th. If the beat one of only two or three

The heat method of determining the strength of the hyposulphite solution is by starch and iodine. The reactions for this method are given in works on chemistry, but a description of the practical application of this method to the leaching process cannot safely be omitted here. If a small quantity of starch is present in a hyposulphite solution, and a solution of iodine is added, drop by drop, the sensitive blue color of iodide of starch will continue to be destroyed as fast as it is produced, as long as any hyposulphite exists. As soon as the

It cost the Con. California and Virginia mine last month \$47,497 for labor and \$91,210 for reduction of ore.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO

Saturday Morning, July 21, 1888.

TABLE OF CONTENTS.

EDITORIALS.—The Cruiser "Charleston," 37. Passing Events; Reese River, Diamond Mining, 44. The Copper Syndicate and its Workings; The Australian Stock Boom; Irving M. Scott, 45.

ILLUSTRATIONS.—The Cruiser "Charleston," 37. Irving M. Scott, 45.

CORRESPONDENCE.—Debris Dams; Amador County Mines, 38. Calaveras County Mining Notes; Tuolumne County Mines, 43.

MISCELLANEOUS.—The Stewart Mining Bill; Quicksilver Ores in Mexico, 38. The Russell Process, 39.

MECHANICAL PROGRESS.—Wire Netting and Fencing; A Curious German Nail; Iron or Steel for Ship Building—Which; Softening Cast Iron; Long Tramway Cables, 42.

SCIENTIFIC PROGRESS.—Illusions of Sight and Motion; Cohesion of Lead; Echo Maker; The Age of the Stars; Scientific and Mechanical Progress; Interesting Discoveries in Spain; A Curious Phenomenon; Experiments with Soap Bubbles; Origin of Electricity in Thunder Storms; To Find the Sun in a Fog, 42.

GOOD HEALTH.—Care of the Finger Nails; Whiskey Not a Cure for Snake Bite; Salt the Great Regulating Agent of Life; To Remove Tartar from the Teeth; Diseases and the Seasons; Cause of Color Blindness; The Nose; A New Remedy for Night Sweats, 43.

USEFUL INFORMATION.—How to Use Glue; The Birds to Have a Respite; The Rabbit's Leap; The Secret of Painting Chinaware; New Method of Securing the Flap of an Envelope; To Make Platinum Adhere to Gold; New Process of Drawing; To Remove Oil Spots on Paper; Firecrackers; Curing a Smoking Chimney; Renovating Picture Frames; New Method of Destroying Insects; The Corn Canning Business; California Newspapers, 43.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 44-5.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 48.

Business Announcements.

[NEW THIS ISSUE.]

Double Acting Cylinder—Kelly Bros., East Oakland. Electric Power—N. S. Keith.

See Advertising Columns.

Passing Events.

The launch of the steel cruiser Charleston from the yard of the Union Iron Works is quite an important event in connection with the industrial interests of this coast. This is the first man-of-war built here at any private yard, and another one is to be commenced immediately. The enterprise of the Union Iron Works is greatly to be commended.

The collapse of the great mining-stock excitement in Australia was anticipated by all who had passed through similar experiences here. Inflation of values is seldom attended with worse effects than in connection with mining shares.

The great Educational Convention now in session in this city has brought many thousand intelligent visitors to this State. Gatherings of this kind are sure to bring good results to California, since these visitors will advertise its advantages all over the United States.

There is nothing that is new in the mining situation aside from what we give in our "summary" on another page. All over the coast the miners are engaged in development work, and the general results are very gratifying.

THE Idaho gold mine, Grass Valley, this State, has to date paid \$4,500,000 in dividends.

Reese River—What it is Like and What Becomes of it.

The following paragraph is going the round of the newspaper press, quoted, we suppose, because it is thought to show the extent to which irrigation is being practiced in the locality designated, which, however, it fails to do:

"Although Reese river in Nevada is hank full near the head, its waters never reach the Humboldt. All the water is turned aside for irrigation."

As stated, Reese river, near its head, is now running hank full, that is, as full as they usually get, this being the time of year when, owing to the melting of the snow on the adjacent mountains, it reaches its highest stage. In this particular the paragraph quoted is right enough, though in one or two others it is open to correction.

And first let it be premised that Reese river, while marked by certain peculiarities and covering a good deal of linear space, is no river at all; though nearly a hundred miles long, it is not, as regards the volume of water it carries, even a good-sized creek. There is hardly a place throughout its entire length but what an athlete could leap across or ford it without swimming. In width it varies from 12 to 15 feet and in depth from 2 to 3 feet, these measurements being quite uniform.

It runs with few sinuosities and a rather brisk current through a broad sagebrush plain—Reese River valley. Its immediate hanks, though low, are never overflowed except when a "cloudburst" may happen to break within its water-shed, a thing of rare occurrence. Gradually, as the snow on the mountains melts, the water flow increases until early in July, when, having reached its highest stage, it gradually subsides without ever overflowing the river-hanks or filling them quite full. The mountains that hem in this valley consist of the Shoshone on the west and the Toiyabe on the east, the two uniting at its head. The Toiyabe is a high and precipitous range, some of its deeper canyons, of which it has many, holding snow until late in the summer.

After pursuing its course for 35 miles, Reese river disappears, its water for the next three or four miles being lost in a broad expanse of meadow land which absorbs it so completely that there is here no surface channel or sign of there ever having been any. Why at this point the stream should have been so arrested and swallowed up, or why at the lower margin of this oasis it should have gathered itself up and resumed its course, is a puzzle to those who have studied this phenomenon.

The restored rivulet, after journeying north another 50 miles or more, makes its final exit, but here not quite so abruptly as at the meadows above. Having gotten thus far, it disappears in a succession of pools standing along its well-marked bed, dies, not suddenly, but in convulsions, as it were. Its objective point is evidently the Humboldt, but it seldom reaches that river, at least above ground, though some of its water no doubt gets there through subterranean channels or by percolating through the porous soil. Not more than two or three times during the past 30 years, that is, since this section of Nevada has been settled or much traversed by the whites, has this rivulet been known to flow above ground all the way to the Humboldt. That it fails to do so is, however, not because its water is diverted for land irrigation, though the most of it is now used for that purpose.

When this stream happens to reach an unusually high stage these stagnant ponds fill up and becoming united form one of those broad, shallow and often evanescent lakes known as "sinks" in the hydrography of the great Utah basin, this being laid down on the maps as the "sink of Reese river." Not elsewhere in all the arid interior do so many considerable streams give out and die in these sedge-bound "sinks" as here in Nevada. Neither in this State, in the Territory of Utah nor in Trans-Sierra California does more than a small proportion of the water flow to the ocean. The most of it is gathered into lakes and "sinks," whence it escapes by evaporation, a process that, in the desiccated and rarified air, goes on rapidly. Having no outlet, these bodies of water become intensely saline.

That such a petty stream as this we are speaking about should have been called a river by the man who first came upon it is not at all

strange, considering the circumstances under which it was discovered. Prior to about 1850, the overland immigration, including the Mormon colonists moving west from Salt Lake City, keeping to the north of Great Salt Lake and striking across to the headwaters of the Humboldt, had followed down that river. This being a very circuitous route, Col. Reese, who had already made several trips from Salt Lake City to the Mormon settlements in Western Utah, conceived the idea of finding a shorter one between these two points. In pursuance of this purpose, on leaving the former place, he kept to the south of Great Salt Lake, following what became afterward the Overland Stage and the Pony Express route. Having encountered but few springs and no large creeks, this desert stream, when he came upon it, seemed to Col. Reese, we can well believe, a veritable river, being much the largest running water he had seen since leaving the Jordan. Perceiving by the osier willows that fringe its banks that it extended a long way up and down the valley, the "path-finder" is to be excused if in his imagination the proportions of the brooklet seemed unduly great.

While Reese river is thus marked by certain strange features, it is neither a picturesque nor an eccentric stream. Though small compared with most California rivers, it does not, like some of them, become a raging torrent in the winter and dry up in the summer. Keeping within its low hanks, it flows quietly but quickly along and with little meandering. It murmurs and ripples, but does not break into violent rapids, nor does it anywhere throw itself over precipices creating falls, cascades or other notable object. Stopping short of its goal some 25 miles, it forms the marshes and fens about which the wild rye and the hunch grass contest with the omnipresent sage for supremacy. Though it presents little of interest to the sightseer, it is of great service to the cultivator of the soil, since neither fruit, grain nor vegetables can be raised here without irrigation.

Diamond Mining.

We have received from Gardner F. Williams, formerly of California, but now general manager of the De Beers Diamond Mining Co., South Africa, the report of the operations there during the past year. During the year, 873,178 loads of "blue ground" have been hauled by the De Beers Co., and 857,906 washed, yielding 979,732 carats of diamonds, realizing £984,035, 14s. 6d. The expenditure connected herewith was £415,188 1s. 11d., leaving a profit of £508,897 12s. 7d. on the actual working. The average yield per load was 1142 carats. This year's working has been solely underground, and the heavy expenditure incurred in previous years for reef work has been done away with. The working expenses, however, will be largely reduced, now that the underground works and machinery are approaching completion. The company was fully justified in its anticipation of the output from the sloping shaft, as the average of the current year has been 2540 loads per day. A second sloping shaft at the west end of the mine will enable them to double the amount.

Convict labor has continued to prove satisfactory. Complete success continues to attend the system of "compounding" the free native laborers. The buildings accommodate 2500 natives.

The balance-sheet and statement of profit and loss of this company show a balance of profit for the year after payment of dividends (\$508,042) of £237,772, being an increase on the year of £58,686. The Oriental and Victoria Companies' properties have been amalgamated with the De Beers mine, and the company has purchased the French Company's property on the Kimberley mine.

Since 1881 this company has paid in dividends £1,013,299, and 41 per cent has been distributed in bonus shares.

When Mr. Williams took charge of the property a year ago the only available means of extracting diamond-bearing ground ("blue") from underground works was through a west end incline shaft. This was originally constructed to haul 1200 or 1500 loads of 16 cubic feet per day of 24 hours, but this capacity has been increased to 2540 loads.

To increase the output, a tunnel was made 380 feet from surface and an aerial tram constructed. A vertical shaft was sunk in the blue

from the 380 to the 505 level, from which blue was hoisted to supply the aerial gear. While the aerial gear was running they hoisted 111,394 loads of 10 cubic feet.

A new shaft was started at the west end of the mine. It has an incline of 56 degrees. This is a two-compartment shaft, is completed to the 685-foot level, and will be an important addition to the workings. The mine was usually worked as an open quarry down to 400 feet, aerial trams being used. But this method was ruinously expensive, and tunnels and galleries were cut. These galleries are worked out 18 feet wide, 18 feet high, leaving a roof of 12 feet of solid blue which forms the floor of the level above, and a solid pillar 18 feet thick between galleries. By the first working of the galleries, 30 per cent of blue is taken out. The tops of galleries or highest levels are then taken out, and the galleries filled with debris from above; lastly, the pillars are removed, and thus nearly the whole of the blue is extracted. This method of working is repeated from level to level.

Mr. Williams estimates that he has "in sight" 7,150,000 loads of blue. During the year, among other work, they drove 21,621 feet of main tunnels. Mechanical haulage will soon be used, consisting of an endless wire rope driven by engine, the same as the cable railway system in use here.

Nearly all underground labor is done on the contract system at set prices per foot or load. The average number of white men employed in the mine is 214 and of natives 1350. To insure a constant supply of laborers, they have increased the accommodation of the "compound" so that they now have 2300 natives in the West End compound, which covers about five acres of ground. Within this area the natives are confined during their term of service and closely guarded, so as to reduce the stealing of diamonds. No alcoholic liquors are allowed inside the "compound."

The company has 11 washing machines and four more are being built. To these machines safety-pans will be attached for the further prevention of loss of diamonds in the washing process. A dam capable of holding 13,000,000 gallons of water has been constructed. On the "washing floors" they have 180 white men and 1400 natives at work, including 300 convicts hired from the Government. Each convict costs £58 per year.

The convict labor is the best native labor, for they are obliged to work some time, while free natives only work about two months at a time. As soon as mechanical haulage is completed all the natives will be placed in compounds, as there will then be no communication between the laborers on the floors and the outside world as there is at present through the truck-drivers. The natives on the floors have to be strictly guarded.

The working of the mine has been suddenly changed (when Mr. Williams took charge) from a huge open-quarry to the underground system. The mine will soon be in a position to furnish blue ground equal to any demands that can be made.

Mr. Williams says: "That the 'blue' will continue to be diamond-bearing to an unlimited depth there can be no doubt, and to my mind the best proof of this is that we constantly find fragments of broken diamonds imbedded in the blue, and the corresponding pieces are not found in the same neighborhood. The inference is that the diamonds were crystallized at a great depth and were thrown up with the blue ground and were not formed *in situ*."

THE employees of the Oro Fino Mining Co., Idaho, have formed themselves into a library association, and propose to employ their leisure hours more profitably than is commonly done in mining camps. Nearly every one connected with the mine has joined in this most praiseworthy movement; subscribing liberally to the fund raised to procure books, magazines and newspapers.

THE Tacoma Ledger says: The bridge at Pasco over the Columbia river, which is 2700 feet long, is completed. It was built by Principal Assistant Engineer Henson of the Northern Pacific, and the superintendent was Engineer A. S. Riffs.

A GREAT deal of ore and concentrates is now coming to the Selby Smelting and Lead Co. of this city.

The Copper Syndicate and Its Undertakings.

The operations and prospects of the Anglo-French Copper Syndicate are getting to be something of a puzzle to outsiders, if, indeed, the managers of the great "trust" are not themselves beginning to entertain some doubts as to the final outcome of their gigantic speculation; evidently things have not gone quite as expected.

This syndicate was formed toward the end of last year for the purpose of controlling the copper markets of the world, to which end, as a first movement, they contracted for the entire product of the leading copper mines on both continents, the quantity to be delivered, and the price being fixed in the contract. This done, the price of copper was at once advanced, going up within the next 90 days from 10 to 17 cents per pound—\$140 per ton.

For the accomplishment of their purpose the conditions existing at the time were extremely favorable. Stocks were limited and prices were low. The winter being at hand, it was impossible for the big companies of Montana and Michigan to increase their output without some delay, as their plant could not at that season of the year well be enlarged. The destructive fire that a few months before had broken out in the Calumet and Hecla, largely diminishing production there, also worked to their advantage.

Up to the middle of June last, the stocks of copper in England and France amounted, with cargoes afloat, to 70,000 tons, the largest ever accumulated; nor is there any reason to believe this accumulation will soon be checked. On the consummation of their scheme this syndicate calculated that production would be curtailed. But in this they have been disappointed. Encouraged by the high prices ruling for copper, new mines have everywhere been opened. Companies already operating have increased their output, while others that had long been idle have again gone to work.

As a result, the product of this metal has not only been largely augmented, but these outsiders are entering the market and underselling the syndicate. Thus far the latter has, by buying much of the copper offering, succeeded in keeping prices up to their standard, thereby averting a break in the market. But the question is, how long can they continue to do this? How long will it be under such a financial strain before something gives way? It is said that the syndicate and their friends cannot afford to let go; but, all the same, can they afford to hold on? The probabilities are that they will allow prices to gradually give way, and thus avoid any sudden crash. By reason of the prevailing high prices, manufacturers have bought copper sparingly, hoping all the while to see a drop in the market. Holding off in this manner for six or eight months, consumers' supplies as well as stocks in second hands are low and must soon be replenished. Well advised of the situation, the manipulators of the "trust," taking advantage of the exigencies of buyers, count on keeping up prices for some time to come.

Meantime, the copper-mining interest flourishes, the late advance in price having proved of especial benefit to this class of properties in California. Our copper-ore deposits are not apt to be large nor generally of high grade. Operated in the rather limited way here practiced, they have not, except in a few instances, paid much profit. Lately, however, they have been doing much better, and this under largely increased ore extraction. That the business has elsewhere experienced a like impetus it is needless to say. While copper mining is at present so prosperous, the immediate future of the industry may be said to be encouraging. While the price of this metal may at an early day be expected to suffer some decline, it will not very soon be likely to drop to former low figures, the great industrial activity prevailing the world over, forbidding such result.

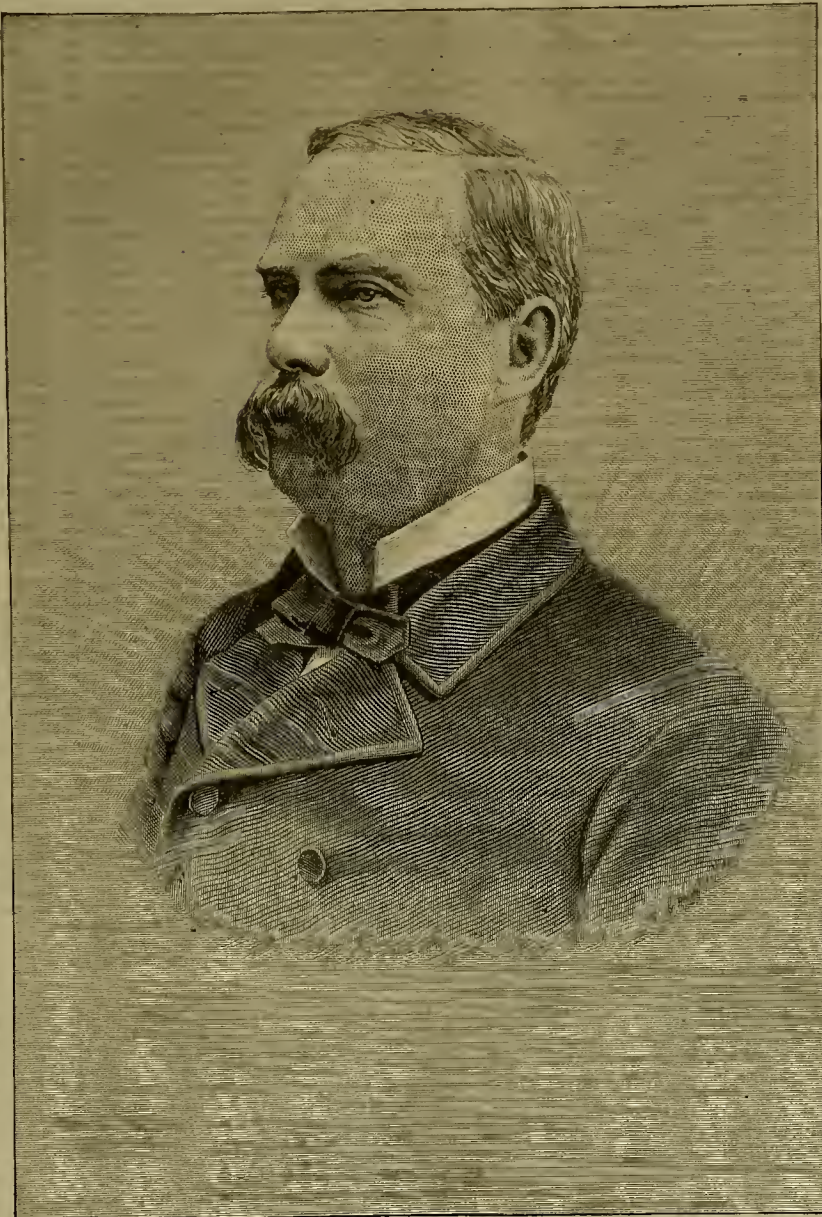
The Australian Stock Boom.

There appeared in these columns not long since some cautionary remarks addressed to the people of Australia warning them against the probable effects of the speculation in silver mines and shares then raging in that country. In those remarks we counseled these people to beware of the fatal consequences that always and inevitably attend speculations of this kind, citing our own experience as evidencing the soundness of our advice, which latest accounts from that country demonstrate was more than warranted by the situation. This wild and widespread excitement had already, before the last steamer sailed from Melbourne, met with a collapse more sudden and disastrous than any

Irving M. Scott.

Probably no one individual has been more prominently identified with the industrial interests of this coast than Irving M. Scott of the Union Iron Works. Commencing as a draughtsman in these works as far back as 1858, he has seen them rise to the first position among similar enterprises in California, and has himself advanced from a humble employe to an owner and manager. A man of exceptional enterprise and public spirit, he has imbued others with his ideas until an establishment has been built up which is a credit to the coast.

Irving M. Scott was born at Hebron Mills, Baltimore county, Maryland, in December, 1837, and received the rudiments of his educa-



IRVING M. SCOTT, GENERAL MANAGER OF THE UNION IRON WORKS.

thing which has ever occurred on this coast. The nominal value of mining shares has, during the past six months, been depreciated to the extent of \$40,000,000 in the Broken Hill district alone, the drop during the two weeks preceding the sailing of the steamer having amounted to \$7,500,000.

The hursting of this mining-share bubble seems to have been followed by a business and financial panic, which, becoming general, involved thousands in ruin, besides those who had been crushed by their unfortunate stock speculations; and now the mourners go about the streets of Melbourne, Sydney and other cities on the far-off insular continent cursing the tricksters that robbed them of their pounds and shillings and hawailing their own cupidity and folly.

We knew weeks ago when the article alluded to was penned, as well as we know now, what was to be the outcome of this Australian stock boom, though we hardly looked for the catastrophe quite so soon. That the denouement has come thus early is to be accounted for, we suppose, on the theory that a short horse is soon carried and a spring gosling is easily picked!

tion in the Baltimore public schools, and afterward pursued an academic course at the Milton Academy in the same city. After completing his course of study, he in June, 1854, entered the manufactory of Ohed Hussey, the celebrated inventor of the first reaping machine, where he learned a great deal of wood and iron-working details. As he was ambitious to become an expert mechanic, in 1857 he obtained a position in the extensive iron works of Murray & Hazlhurst, Baltimore. He soon became an expert draughtsman, and his employers transferred him from the department of machinery to that of design, and placed him in charge of the construction of stationary and fire engines.

When he came to California "to grow up with the country," he was employed by the late Peter Donahue, then owner of the Union Iron Works. He remained there as draughtsman until 1862, when he took charge of the drawing department of the Miners' Iron Works, returning, however, to the Union Works in 1863. On his return he was made superintendent. When Col. Donahue retired from active connection with the works Mr. Scott became a

partner in the new firm of H. J. Booth & Co., the firm consisting of H. J. Booth, Geo. W. Prescott and Irving M. Scott. In 1875 Mr. Booth retired and a new partnership was organized under the title of Prescott, Scott & Co., the younger brother of Mr. Scott, Henry T. Scott, joining the firm. Later on the firm was reorganized under the title of the Union Iron Works, an incorporated company.

The old premises on Mission, Fremont and First streets became too small for the operations, and extensive works were erected on the Potrero. New machinery of the latest designs was purchased, splendid brick buildings put up, a large dry-dock was built, and an iron and steel ship-building plant was added to the works, which are now the most extensive on this coast, and among the largest of the United States.

When it was found that the Government was to start in to build a new navy, and that cruisers were to be constructed, an effort was made to obtain the work on one or more of these cruisers for this coast. The Union Iron Works was prepared to do any of this work, and put in bids. Mr. Irving Scott went to Washington, conferred with the Secretary of the Navy and those in authority, and convinced them that the work could be done here. In the face of great difficulties he finally succeeded in getting the work. It was mainly due to his persistent and intelligent efforts that this was accomplished, and contracts for two cruisers secured. One of these vessels, the Charleston, was launched this week, and the other will shortly be commenced.

Mr. Scott is a fine public speaker, and a writer of more than ordinary ability. His published addresses and articles always attract attention. He is known to be a thinker, and one who expresses his ideas clearly, whether from the platform or on the printed page. His ability as a mechanical engineer is widely recognized. He has been engaged in the design and construction of all sorts of machinery for general and special purposes. In mining and pumping machinery he has had wide experience incident to the peculiar conditions existing on this coast.

While Mr. Scott is known as a practical, "self-made" man, he has found time to inform himself on many topics not immediately connected with his business. He is a man of talent, education and refinement, fond of art and literature, and fostering them in every way. There is no better posted man on industrial matters in the State. He is connected with many organizations in this city, and in all has taken an active interest, so that he has been called upon to serve as director and president of most of those he has joined. The industrial classes of this coast owe to Mr. Scott and his partners in the Union Iron Works a debt of gratitude for building up and maintaining the magnificent enterprise at the Potrero, where between 1000 and 2000 mechanics are constantly employed. Large as these works were when first designed, their scope has gradually been broadened and the interests extended, and it is proper to appose that when further extensions are desirable, they will be made.

For the portrait on this page of Mr. Scott, we are indebted to the *Resources of California*. It was made direct from a photograph a couple of years since, and is a good picture of the subject of this sketch.

THE GILA MONSTER.—At the last meeting of the California Academy of Sciences, Prof. Ward of Rochester, N. Y., described a museum connected with the Coronado Beach hotel, San Diego county. This brought up the subject of the Gila monster, which people thought poisonous, but Dr. Behr stated it was harmless. Prof. Ward agreed with the doctor. His little daughter had one for a plaything for three months before its reputation for fatal biting reached the family. Since then his son has had three healthy Gila hite pigs, chickens, dogs, chipmunka, squirrels, etc., but with the exception of one sick chicken all recovered without any manifestations of distress or inconvenience from the bite.

MR. JOHN L. DOYLE left San Francisco this week for a trip through Oregon, Idaho and Montana in the interests of the MINING AND SCIENTIFIC PRESS. We hope that our friends whom he meets will assist him in his mission and give him such information as he desires.

MECHANICAL PROGRESS.

Wire Netting and Fencing.

The use of wire netting and fencing, embracing all kinds of woven fabric made by twisting wire into meshes, has grown with wonderful rapidity in this country in the past five years. It is by no means a new article of manufacture. It has been in use in Europe for many years. Australia consumes it annually by the thousand miles for sheep-ranches and kangaroo fencing. Prior to 1883 it was imported in considerable quantities into this country from Europe, and strenuous attempts were made to popularize it. At that time it was being manufactured here to a limited extent, the Gilbert & Bennett Manufacturing Company of Georgetown, Connecticut, having embarked in the business some 15 years previously, with machinery for the production of all sizes. The Clinton Wire Cloth Company of Clinton, Mass., and Sedgwick Bros. of Richmond, Ind., also made netting with coarse meshes for a few years prior to 1883, but the development of the business was very slow, owing to the low rate of duty on wire products, which enabled foreign manufacturers to control the trade. In 1883 this duty was changed to harmonize with the tariff on other manufactured products of a similar character, and the whole aspect of the trade was almost immediately altered.

As a result of the enlarged opportunity thus afforded to waiting capital, the number of manufacturers of wire netting has more than doubled within the last ten years. There are now six large establishments in the Atlantic States and one in this city, while the home product has increased fully ten-fold within the past five years. The consumption of such goods has largely broadened, being now used for purposes wholly unanticipated but a short time since.

Moreover, under the sharp competition, the improvements introduced and the fostering influence of an increased tariff, the importation has fallen off, practically to nothing, while the price has been reduced fully one-third. In the manufacture of netting some establishments use galvanized wire, while others galvanize the wire after the fabric is woven, some advantage being claimed by those who use the latter process. The gauges of wire used range from No. 20 to No. 13. The size of the meshes varies according to the use to which the netting is to be put, ranging from one-half inch to five inches. The width of the netting usually made runs from 6 inches to 6 feet. When wider netting is needed for a special purpose, two widths are taken.

The multiplied uses of wire netting is stated by the *Iron Age* as follows: The netting with meshes up to one inch in size is used for making a perforated or open surface on which to spread articles for drying, such as glass, cardboard, printed matter, tobacco, etc. Wire glue netting has completely revolutionized the mode of drying glue. The fine mesh netting is also used for divisions in fish ponds, fish weirs and traps, and to keep birds from building nests around cupolas and the tops of buildings. The netting with $1\frac{1}{2}$ to $1\frac{1}{2}$ inch meshes is used for rabbit fencing, game-inclosures, pigeon-houses, aviaries, park cages, wire partitions between parts of a room, etc. Two-inch meshes are a suitable size for poultry yards, coops, wire trellises, lawn borders, pea or other vine supports, and for inclosing lawn tennis grounds. Coarser meshes are adapted to lawn and garden fencing, and even stock and farm and railroad fencing, being sufficiently strong to turn cattle. The manufacturers of netting for fencing have thoroughly developed its capabilities in this line, and are furnishing gates to correspond with the netting used, together with metal posts. Among the miscellaneous uses to which the various kinds of netting are put can be mentioned office railings, desk railings, wire signs, tree guards, borders for flower beds, croquet ground borders, ornamental summer-houses, etc. It has been used with good effect in large public buildings to prevent an echo, being hung from the ceiling and almost invisible.

So rapidly are the uses multiplying to which netting seems specially adapted, that the manufacturers are excusable for their enthusiasm over it. They look forward to the expansion of their industry to much larger proportions than it has yet attained. In many portions of the country its use has just begun. It is not an article that is used only by farmers and owners of extensive grounds, but its consumption is greatest in thickly-settled districts, and will increase with the growth of the country.

A CURIOUS GERMAN NAIL has recently made its appearance. It very much resembles a wire nail, with the exception that it is square. Like the wire nail, it is of uniform size from head to foot. A correspondent of the *Iron Age* speaks of this nail as follows: "A few days ago I received from Germany a large case of goods. It was rather a serious matter to open it. Crow-bars were necessary, and the only way to get the goods out was by breaking the case into small pieces. The nails were different from any which I have ever seen, and I can bear testimony to their tenacity in holding wood. I send you a handful of these nails as a contribution to your museum of hardware curios. From their peculiar shape one might imagine they were made from old bayonets. They have been a source of much speculation to our carpenters and pat-

tern-makers, who cannot agree as to the way they should be driven with relation to the grain of the wood. One shrewd old fellow, after looking one of these nails over very carefully, remarked that he could not see as it made much more difference about the direction of the grain than it would in cutting a barrel-head out of a board."

Iron or Steel for Ship-Building—Which?

We clip the following from a letter of the regular English correspondent of the *American Manufacturer*:

Evidences are increasing to the minds of our steel-makers and ship-builders and constructive engineers that the more rapid corrosion of steel, as compared with iron, is a fully established fact which is likely to have a more important bearing upon the steel trade than has hitherto been generally supposed. To such a degree is this evidence growing that some of our iron-masters are now putting on more courage regarding the future of their industry in branches where steel has threatened to become supreme than has previously been apparent.

Which is the Best?

It might be fancied that this question had long ago received its answer. But there are those among us who contend that iron is not yet so entirely superseded as had in some circles been imagined. Although almost all the vessels now built are nominally of steel, they yet contain a considerable quantity of iron. The floors, engines and boiler seatings, bulkheads, bunkers, and even deck-plates, are increasingly being composed of the older material. A "steel ship" may, consequently, now contain from one-fifth to one-half of all the metal-work of iron. The more iron is used under the existing conditions the more saving can be effected in the cost of a vessel.

Iron Not Yet Done For.

The thickening of the scantlings, as ordered by the Lloyd's Register, has also to some extent diminished one of the chief advantages claimed for steel ships, namely, their superior lightness and carrying capacity. Certain of the steel-masters on the northeast coast contend that the time is approaching when the shell alone will be of steel, all the other metal-work being of iron. In this expression of opinion my readers must not assume that I am pledging my own view. I am merely recording the views which are finding exponents in circles where ship-building is prominently to the front.

NATURE-SMELTED IRON.—On the North Saskatchewan river in the Northwest Territory of Canada, about 70 miles above the town of Edmonton, Alberta, there is an interesting example of naturally-reduced iron. Along the river bank a lignite formation crops out for several miles, overlaid by clay shales and soft argillaceous sandstones containing nodules of clay ironstones. These nodules are similar to others found at Edmonton, and proved by analysis to be carbonates of iron, containing 34.98 per cent of metallic iron. The Saskatchewan seam of lignite has at some time or other been burnt, leaving a bed of ashes, clinkers and burnt clay, in places 20 feet thick, and now covered by a dense growth of grass and underwood. From this mass of burnt clay pieces of metallic iron can be picked out, weighing in some cases 15 or 20 pounds. They have evidently been reduced from the nodules above mentioned by the heat of the burning lignite. Most of the pieces of iron are much rusted; but when scratched with a file they show a bright surface. The observation is interesting, and to some may help to explain how primitive man originally discovered the reduction of iron ore.

SOFTENING CAST IRON.—A correspondent of the *American Machinist* suggests the following for softening cast iron: "Heat the cast iron to a red heat and quench in water about the same heat, and use the same judgment as you would in quenching a piece of steel, then heat again to a red heat, and allow to cool slowly, the same as you would anneal steel. The above method has given me perfect satisfaction. There may be a difficulty in large pieces, from their liability to crack in quenching, but it will soften them."

LONG TRAMWAY CABLES.—A rope just finished for the Edinburgh Cable Tramway is 17,000 feet long. This is the longest unspliced cable in use in Great Britain, but for the Melbourne (Australia) tramways ropes 20,000 and 26,000 feet in length, and without splicing, have been supplied. The latter weighs 24 tons.

BOATS MADE OF IRON AND STEEL are gradually coming into use on our Western rivers. The largest steel hull boat for the Western river trade was launched a few days ago at DuBuque, and the large iron coal boat recently built at Pittsburg is giving a good account of herself.

CAST IRON will expand and contract between the extreme ranges of temperature in this country with a force equal to $4\frac{1}{2}$ tons per square inch of surface exposed.

WHAT is said to be the only locomotive engine ever constructed wholly in the South, as far as can be learned, has been built in Anniston, Alabama.

SCIENTIFIC PROGRESS.

ILLUSIONS OF SIGHT AND MOTION.—The senses are subject to illusions in proportion to the remoteness of the information that they give from the immediate necessities of the organism. Touch, the most immediate and least inferential of the senses, is least subject to illusions, while sight is so very much so that the blind often say they have an advantage over the seeing in being free from visual illusions. The illusions of bodily motion are much nearer to those of touch than to those of sight, and yet they can under certain conditions be induced through visual impressions. Of this the writer has recently had two interesting examples. He was standing upon the floor of a railroad depot, the boards of which were laid with a considerable open space between them; and the shadow of an electric light was moving up and down by the swinging of the light in the wind. Looking at the floor, it seemed as though the shadow were stationary, and the floor-boards moving. From this it followed that the person on it was moving, too, and the writer distinctly felt the swinging sensation; in fact, his attention was called to the phenomena by the feeling of motion. The other observation was as follows: While riding in the cars and looking out of the window, the trees and all are seen to move in the opposite direction. If, now, one looks in a mirror so situated that it reflects the passing landscape, which, however, must not be visible except in the mirror, one has the illusion of moving in the opposite to the real direction of motion, owing to the reversal of the image in the glass. In both these cases an immediate bodily sensation is induced by a more or less unconscious inference through visual sensations.—*Science*.

COHESION OF LEAD.—It has long been known that perfectly clean surfaces of lead, when pressed together, would adhere to each other with some force. The experiment ranks as one of the classics in simple science. A very good way to show it is with bullets. Small surfaces, flat and clean, are prepared on two bullets by cutting off a little slice with a knife. When pressed together with a wrenching motion, the two will remain attached. A third bullet may now be fastened to one of the pair, and in this way a string of bullets, six or more in length, can be built up. As the phenomenon depends on the absolute cleanness of the surfaces, and as it is a case of adherence of like to like, it is often invoked as an illustration of cohesion. Pure India rubber shows the same tendency, but in a far stronger degree relatively speaking. Whether it is true cohesion or not is uncertain, especially in the case of lead. The method of obtaining this cohesion by employing mechanically prepared surfaces is a far less attractive method than the one which Faraday used in his lectures. He melted the lead and poured it out in two pieces upon a flat stone. After they had cooled, he pressed together the smooth lower surfaces of the lead, and thus obtained strong attachment. The flat plane on which the lead rested gave the essential true surface, while during the cooling it was perfectly protected from oxidation or dust. When lead is thus treated, even the upper surfaces which have been exposed to the air will answer for the experiment.

ECHO-MAKER.—The *Popular Science Monthly* describes a curious and ingenious device called the "Echo-maker," to be used on ships at sea. A flaring funnel is screwed to the muzzles of a rifle. When a supposed obstacle is near the vessel the rifle is fired in its direction, and if the obstacle is there the beam of sound projected through the funnel strikes the obstacle and rebounds, and as the echo is more or less perfect in proportion as the obstacle is more or less paralleled to the ship from which the gun is fired, and as it is near or remote, the position of the obstacle may be inferred. The inventor claims that a sharp sound projected at or nearly at an object, and only when so directed, will in every case return some of the sound sent, so that, theoretically, there will always be an echo, and the difference in the time between the sound sent and the echo will indicate the remoteness of the object. The naval board tried the echo-maker and found that a return sound could be heard from the side of a fort one-half mile away; from passing steamers one-quarter mile off it broadside to; from bluffs and sails of vessels at about the same distance, and from spar buoys 200 yards away.

THE AGE OF THE STARS.—A very interesting address delivered at the annual public session of the five academies of France, October 25, 1887, by M. Janssen, the director of the observatory at Meudon, France, is published in the December number of *Ciel et Terre* and the January and February numbers of *L'Astronomie*. The principal thought is that the idea of evolution may be applied to the stars as well as to terrestrial things. The stars are not fixed and eternal, but are subject to change and time. They have a beginning, a period of activity, a decline, and an end. By recent advances in the study of celestial physics, especially with the spectroscopic, we are enabled to know something of the actual condition and relative age of some of the stars. We may assume that the age of stars, other things being equal, will depend upon their temperature, and that their temperatures are higher in proportion as their spectra are richer in violet rays. The majority

of the stars which are visible to the naked eye are white or bluish, and therefore at a high temperature; but many are yellow or orange, like our sun, showing that they have passed their youth; while others are from dark orange to dark red, showing that their sidereal evolution is far advanced.

SCIENTIFIC AND MECHANICAL PROGRESS.—A Toronto, Canada, paper truthfully says: "After the moral and religious instruction of the family is secured, we know of nothing more interesting and instructive than a record of the progress of modern science and its marvelous achievements." The establishment of journals in all our leading cities of an educational character, devoted to scientific, mechanical and industrial progress, is one of the most hopeful signs of the times. Such journals promote industry, progress, thrift and intelligence wherever they are read, and exert a good, healthy, moral influence in any community which extends to them a liberal patronage. We present this and its sister journal, the *Pacific Rural Press*, as two publications of this character, which are eminently deserving of patronage and of special value to every mechanist, mechanic, manufacturer, engineer, and to the farming and mercantile community as well.

INTERESTING DISCOVERIES IN SPAIN.—Recent explorations in Spain by two Belgian scientists have resulted in some very interesting discoveries. Relics of a prehistoric race have been found in great abundance, ranging from the stone age to that of bronze and metals. These people buried their dead not only in stone graves or cells, but also in great jars of burnt clay, accompanied by pieces of pottery and other articles of use and value. This form of jar burial is very widespread, and examples have been found from Japan to Peru. These relics are supposed to belong to that ancient race which lived in Europe previous to the Aryan immigration, the various branches of which are known as Iberians, Pelasgians, Lignians, etc., according to the country in which they lived. Several skeletons were found adorned with silver and gold ornaments. One of the most remarkable relics is a female skull encircled by a band of silver, to which is attached a thin plate of the same metal.

A CURIOUS PHENOMENON.—A curious illusion of vision has been made the subject of investigation by a French scientist, the result of which, it is thought, may account for the apparent oscillations or swinging of stars sometimes observed; that is, on the eye looking constantly for a considerable period of time at a small, feebly lighted body, itself being in complete darkness, the body appears to oscillate or to describe certain curves. A study of this phenomenon has led to the conclusion that it is of the subjective order, appearing to be, in fact, of the same nature as the movement of a star observed when a person leans his hand against a wall and fixes his eye upon the star, the star appearing to be agitated in its place and to oscillate rapidly. In order that the motion be noticed, there should be no moon, and the sky should be clear.

EXPERIMENTS WITH SOAP-BUBBLES.—At a recent meeting of the Physical Society, London, C. V. Boys described and performed some experiments on soap-bubbles, and by their aid demonstrated in a remarkable manner the phenomena of surface tension, diffusion, and the magnetic properties of gases. By blowing one bubble inside another he showed that there is no electrical force inside a closed conductor. A peculiar property of soap-bubbles is their refusal to come into contact when knocked against each other; they may receive violent shocks and still remain separate. If, however, an electrical body be brought in the vicinity they immediately coalesce. So sensitive are they to electrical attraction that a potential difference due to one Leclanche cell between the two bubbles causes them to unite.

ORIGIN OF ELECTRICITY IN THUNDER STORMS. Investigations made by Sohneke have led to the conclusion that the electricity which is discharged during a thunder-storm is produced by the friction of water and ice—that is, the ice is electrified by friction with water; just before a thunder-storm, water clouds (cumuli) and ice clouds (cirri, cirrostrati) appear simultaneously in the sky, and the friction of these particles of ice and water is, according to this theory, a sufficient cause of the electricity which is generated.

TO FIND THE SUN IN A FOG.—A correspondent writes to the *Boston Journal*: "Reading accounts of so many being lost in the snow and fog, I would call your attention to a simple means of determining the position of the sun at any time of the day, which is by placing the point of a knife-blade or sharp lead pencil on the thumb nail, which will cast a shadow directly from the sun, no matter how thick the snow or fog is. Try it."

A PHOSPHORESCENT GLOW is observed upon cutting into brown sugar which has been oaked in its receptacle, which has been supposed by some to depend upon the phosphorus contained in the boneblack used in refining it. The actual cause of the phosphorescence is, however, unknown, but is an inherent quality of the sugar. Upon breaking the large sugar lozenges sold by druggists the same phenomenon is observed.

GOOD HEALTH.

Care of the Finger-Nails.

One consideration that makes the care of the nails of high importance is the fact that every person who labors with the hands is liable to gather, under their free margin, matter which may be very poisonous. Many cases have occurred in which slight scratches of the skin by means of finger-nails have resulted in malignant and even fatal inflammations.

If, from any cause, the nail becomes thick and inelastic, it soon becomes rough and assumes the appearance of an excrescence rather than an ornament. In this condition it is much more difficult to keep clean. To avoid this the hand should not be subjected to the action of strong alkalies, such as quicklime, etc.; neither should foreign substances be removed from the surface by scraping, as this will usually cause the nail to thicken.

To cleanse the surface and the margin adjoining the skin, a soft nail-brush, mild soap, and soft water should be applied once each day; while the foreign matter accumulated under the margin should be removed as often as the hands are washed, with the use of a hard wood or ivory nail-cleaner.

This being done while the nail is wet, one movement will generally be sufficient to remove the substance completely. A knife-blade is objectionable for this purpose because it scratches or roughens the nail surface.

This paring should also be done while the nail is soft from washing, with an instrument which will make a perfectly smooth edge, and sufficiently often to limit the breadth of the free margin to about one-twelfth of an inch. This breadth is best, especially in the case of persons who have to do rough work with the hands, for two reasons: It prevents the heaving of the nail and also the accumulation of much foreign substance. The corners should not be very closely cut, or the troublesome condition known as an ingrown nail may be produced. To prevent the breaking of the skin near the root of the nail (commonly called "hanging-nail") the skin should be pressed, not scraped, by a dull instrument, back from the nail, once a week.

WHISKY NOT A CURE FOR SNAKE BITE.—Dr. Henry C. Yarrow, whose name is just now prominently before the public as one of the physicians attending General Sheridan, contributes to the *Forest and Stream* a detailed and extremely interesting account of the recent series of experiments conducted by him at the National Museum to discover an antidote for rattlesnake venom. Alcohol in various forms is probably to-day the agent in which the great portion of the people of the world have the utmost confidence as an antidote, a faith unfortunately not well founded if we may believe the many experiments which have been tried. According to Mitchell, it is merely a counteractive agent, a stimulus simply, which may hazy the patient over the prostration produced by the venom, but as a direct antidote it fails, and this is proved by the fact that a mixture of alcohol and venom is no less deadly than the venom itself. It has been claimed that persons in an intoxicated condition, or those habitually indulging in alcoholic liquor, cannot be poisoned by venomous snakes, but abundant proof to the contrary exists, notably in the case of Adam Lake, reported by Dr. Horns in the *North American Medical and Surgical Journal*, 1831, XI, 227. This man had been in the habit of taking from half a pint to a pint of alcoholic liquor daily, and was intoxicated when bitten by a rattlesnake. Notwithstanding the services of excellent physicians, a number of repeated antidotes being used, he died in less than 24 hours.

SALT THE GREAT REGULATING AGENT OF LIFE.—In a recent work by Prof. Burggraaf of Ghent, the prominent theory maintained is that salt is the great regulating agent of life, and on the proper use of which human longevity largely depends. Among the interesting facts recited by Prof. B. is that about the end of the last century a terrible epidemic, bearing some analogy to scurvy, broke out in Saxony, making such rapid progress among the poorer classes that the Government ordered an inquiry into its nature and cause. The result was the establishment of a singular fact, viz., that miners, although reduced to the same misery as other workmen, remained with their families completely exempt from the malady. The diet of the miners differed from the others only in one point, viz., that being employed by the State they were supplied with salt gratuitously. Salt was then prescribed as a curative measure, and the epidemic disappeared.

TO REMOVE TARTAR FROM THE TEETH. Should any little incrustation (tartar) appear on the sides or at the back of the teeth, which illness and very often the constant eating of sweetmeats, fruit, and made dishes containing acids will cause, put a little magnesia on your brush, and after a few applications it will remove it.

DISEASES AND THE SEASONS.—While it appears from the records of English health officers that some diseases have special seasons in which they are most likely to prevail, it is not shown that occasional variations in temperature have much influence in the matter. Scarlet fever is at its minimum from January to May, and at its

maximum in October and November. Diphtheria is more evenly distributed through the year, and is most dangerous a little later than scarlet fever. Measles and whooping-cough seem to be somewhat aggravated by cold weather, but are most fatal in May and June. Hot weather is adverse to smallpox, and favorable to disorders of the bowels, particularly in children.

CAUSE OF COLOR BLINDNESS.—An article in the *Medical Press* advances the idea that the particular defect which gives rise to color-blindness lies not in the eye itself, but in the brain. Certain persons cannot distinguish between two musical tones; yet, as they hear both, the defect is not deafness, or any fault of hearing. Prof. Rimsay, the advocate of the idea, therefore argues that in people who have no musical "ear," the brain is at fault, and assumes that it may be equally true that the inability to perceive certain colors is not due to any defect of sight, but to the mental lack of power in interpreting the impressions conveyed to the brain by the optic nerve. If this be true, the question of color-blindness ceases to be a physical problem, and may be classed among cases for the mental physiologist to deal with.

THE NOSE.—It is said by M. Le Bec, a French savant, that "the nose is gradually losing its power to discharge its traditional function in the case of civilized people; when the sense of small vanities altogether, as will infallibly be the case some day, the organ itself will follow its example sooner or later, as nature never conserves useless organs and the nose must go." The olfactory sense is keener in the savage than in the civilized man. Somebody else declares that the nose is the source of most of our physical woes, this organ being largely responsible for headache, cough, dyspepsia, sarache, neuralgia, hay fever, etc. It may also be added that it is the source of many social troubles, by poking into other people's business. Will the coming man be noseless? Who knows?

A NEW REMEDY FOR NIGHT-SWEATS.—Dr. Sampson Pope, in a communication to the *Therapeutic Gazette*, calls the attention of the profession to an indigenous drug for the relief of night-sweats. He says: "The remedy is one indigenous to the whole country; it is, therefore, within reach of us all. It is the cinquefoil, *potentilla canadensis*, called by some botanists, *potentilla artemisiifolia*. I have etopped night-sweats with it when atropine failed to relieve. It is pleasant to take; when drawn it has an agreeable odor much like table tea. The manner of preparation is to pour boiling water on a handful of the vine, leaves and root. Let the patient drink ad libitum."

USEFUL INFORMATION.

HOW TO USE GLUE.—For glue to be properly effective, remarks the *Scientific American*, it requires to penetrate the pores of the wood; and the more a body of glue penetrates the wood, the more substantial the joint will remain. Glues that take the longest to dry are to be preferred to those that dry quickly, the slow drying being always the strongest, other things being equal. For general use, no method gives such good results as the following: Break the glue up small, put it into an iron kettle, cover the glue with water, and allow it to soak 12 hours. After soaking, boil until done. Then pour it into an air-tight box, leave the cover off until cold, then cover up tight. As glue is required, cut out a portion and melt in the usual way. Expoe no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. Never heat made glue in a pot that is subject to the direct heat of the fire or of a lamp. All such methods of heating cannot be condemned in terms too severe. Do not use thick glue for joints or veneering. In all cases work it well into the wood, in a similar manner to what painters do with paint. Glue both surfaces of your work, except in cases of veneering. Never glue hot wood, as the hot wood will absorb all the water in the glue too suddenly and leave only a small residue.

THE BIRDS TO HAVE A RESPIRE.—Ladies are no longer to wear birds on their bonnets and hats. Thus, says London *Queen*, has it been decreed by fashion. The benevolent edict comes just in time to save the last remaining members of the race of humming-birds and birds of paradise. The great forests of India, Brazil, and the banks of the Mississippi have been ransacked, and have yielded up their treasures of winged jewels to adorn the feminine headgear. Now at last there is to be a truce to the massacre, and the pretty denizens of the woods may sing and fly awhile in peace. To estimate the extent of slaughter perpetrated for the sake of woman-kind's adornment, we may take the statement of a London dealer, who admitted last year he sold 2,000,000 small birds of every possible kind and color, from the soft gray of the wood pigeon to the gem-like splendor of the tropical bird. Even the friendly robin has been immolated to adorn the fashionable bonnet.

THE RABBIT'S LEAP.—When speaking of the distance a rabbit can cover in a single leap, a sportsman writing on the subject says he once measured the spaces cleared by an old Mexican

hare when running in the snow, and found the first two leaps equaled 12 feet each, and the third more than 13 feet, but he never saw that distance exceeded by that species. He says the common rabbit will, when frightened, leap six feet, and on one occasion he measured a jump that was more than seven feet. When moving at an ordinary rate the rabbit jumps about two feet, and the hare rather more than four feet at a single leap.

THE SECRET OF PAINTING CHINAWARE.—Jenny Juco, in the *American Magazine*, says that the present manufacture of porcelain is a comparatively recent industry, and is constantly reaching fresh results. The underglaze treatment of china, for example, was not known here 25 years ago; it was a secret guarded most carefully and confined to a few European and Eastern factories and workers. It was a girl who discovered it—Miss McLaughlin—and now it has become the property of all china decorators. Her success was not alone important to china-painting as an art; it was specially valuable in raising the estimate put upon the work of her own sex, and has perhaps done more than aught else to stimulate to good results the work of women in this branch of industrial art.

NEW METHOD OF SECURING THE FLAP OF AN ENVELOPE.—To secure the flap of an envelope so that it may not be readily opened without betraying the fact that it had been tampered with, has been the ambition of a good many inventors. An envelope constructed as follows is the subject of a recent English patent: The flap is so cut and shaped as to bring the point of it to the top right hand corner of the front side of the envelope, where the gummed surface of the flap secures it to the front of the envelope. The postage stamp is then fixed over the flap so that the envelope cannot possibly be unfastened without destroying the stamp.

TO MAKE PLATINUM ADHERE TO GOLD.—Platinum can be made to adhere to gold by soldering in the following manner: A small quantity of fine or 18 carat gold should be sweated into the surface of the platinum at nearly a white heat, so that the gold shall soak into the face of the platinum. Ordinary solder will then adhere firmly to the face obtained in this manner. Hard solder acts by partially fusing and combining with the surfaces to be joined, and platinum alone will not fuse or combine with any solder at a temperature anything like the fusing point of ordinary gold solder.

NEW PROCESS OF DRAWING.—A process has been perfected and patented for drawing upon wood by means of a fine metallic point kept red-hot, so that the lines are actually burned into the surface. A powerful oxy-hydrogen or other flame keeps the point always at a high temperature, and yet the apparatus is so compact that it may be used with the ease and freedom of a pencil. It is, furthermore, so adjusted as to produce at will all shades of brown, from the lightest to that verging on black.

TO REMOVE OIL SPOTS ON PAPER.—Oil spots on wall-paper caused by persons leaning their heads against the walls may be removed by making a paste of fullers' earth and cold water, and laying some gently on the surface to be cleansed, leaving it until dry, when it may be brushed off, and the spot will have disappeared. It works best on plain paper, but it does not succeed so well on thoroughly colored.

FIRECRACKERS.—It is curious that all attempts to produce firecrackers in this country have failed to secure a home-made article that can compete with the firecrackers from Japan and China. The importation from these two countries this year will amount to 300,000 boxes, an increase of 100,000 over last year's importation.

CURING A SMOKING CHIMNEY.—A profound scientist of the nineteenth century living in Boeton had a smoking chimney in his house. After he had spent \$400 for various devices to cure it, a ragged tramp came along and suggested that he build it six inches higher, which was done and the evil eradicated.—*Detroit Free Press*.

RENOVATING PICTURE FRAMES.—You may improve dingy or rusty gilt picture frames by simply washing them with a small sponge moistened with spirits of wine, or oil of turpentine, the sponge only to be sufficiently wet to take off the dirt and fly marks. They should not be wiped afterward, but left to dry of themselves.

NEW METHOD OF DESTROYING INSECTS.—Moths or any summer-flying insects may be found to destruction by a bright tin pan half filled with kerosene set in a dark corner of the room. Attracted by the bright pan, the moth will meet his death in the kerosene.

THE CORN CANNING BUSINESS.—Eighty corn-canning factories have been in operation this year in Maine, and over 14,000,000 cans of sweet corn have been put up, besides large quantities of apples, beans, tomatoes and other vegetables and fruits.

CALIFORNIA NEWSPAPERS.—California has 520 newspapers and periodicals published within her borders. This is an average of exactly 10 to each county in the State. Pretty good showing for a young State.

Calaveras County Mining Notes.

EDITORS PRESS:—The Albany Flat quartz mine and mill has within the past week changed hands, two of the partners having sold out to Messrs. Hayward & Hobart. These gentlemen are now investing largely in mines and mills both in Tuolumne and Calaveras counties.

This mine has a good strong vein of 8 to 20 feet of high-grade ore which pays from \$25 to \$500 per ton. Some of the rock which the writer saw would go away up in the thousands. As to the permanency of the lead there can be no question, and ere long new works will go up which will give employment to large numbers of men, greatly helping Angels, and adding to the permanent prosperity of the place. New buildings are now in process of construction on the ground.

The Tryon Mine.

At Albany Flat, is now being prospected with most flattering results, the ledge showing similar black spots of ore to the mine just sold to Hayward & Hobart, and which has proved so exceedingly rich.

The Smyth Mine.

At Angels, is now down only 24 feet with the shaft, yet the ore or vein-matter shows solid for six feet in width. This not only shows up a body of high-grade sulphuret, but also contains visible free gold. Very shortly this will prove a most valuable mine; it is not for sale. The owner having stuck to his prospecting for 12 years past, now backs up his judgment by hanging to it and working it himself. He has 100 tons of ore in mill from the Whitell mine, to crush which promises to pay very well. Angels is having an unusual mining boom, this claims all around them paying handsomely. Claims which five years ago could be bought for a few hundred dollars now cannot be touched for as many thousands. Improvements of a permanent character are going up in the town, and it is not presumption to say that within the next five years it will lead any other in the State as a gold-producer.

New mills are going up, and buildings are being built, all pointing to prosperity and success. Such general pay, from low-grade ores with immense ledges to the higher class of small ledges, or those of say three to five feet, the writer has not seen or heard of for years past.

The Union Mine.

Near San Andreas, has again started up the mill under the management of Mr. Ricketts. Twenty stamps out of the 30 are now running. Like most of the mines in this part of the county, the ore is low grade, but with good and ample milling facilities pays expenses with a good margin for profit.

The Irex Mine.

At Rich Gulch, six miles above Mokelumne Hill, has just completed building a new mill of 20 stamps, which is one of the finest and best arranged of any in the State. They expect to be in running order on the 15th of the present month, turning out bullion thereafter.

W. A. K.

Tuolumne County Mines.

EDITORS PRESS:—The Keltz mine has been closed down for some time past owing to lack of funds for needed improvements and proper development. Meantime some vandal (in the absence of a keeper at the mill) broke in and stole a quantity of silver-plated plates. The superintendent, Mr. Sharwood, has offered \$100 reward for the capture of the thief.

The Hyde.

This fine piece of property has been under lease for some time past, but this lease has about expired, and unless some further understanding can be arrived at is likely to close down for awhile. The mine is without doubt a most excellent as well as large one, and can easily be made a large-producing property under good management.

North Star Mine and Mill (Somerville). This property is in charge of and managed by Dr. F. J. Corbett. The mill is now running in good order, and the grade of the ore, we understand, is of a very satisfactory character, yielding an average of about \$15 to \$20 per ton, with ten stamps running.

Experimental Gulch Mine (Columbia). This mine has been bonded to Valentine & Co. of San Francisco, who erected thereon a ten-stamp mill, and after making several runs found it did not pay. Consequently they have given it up. Since then some of the men working for them got out a small lot of rock and put it through the mill, realizing satisfactory results, but the future is not assured.

The Shanghai and Morgan Mines Above Columbia are still dormant, although the owner is considering the placing of a mill on the property in the near future. Mr. Morgan has stuck to these mines for about 20 years past. Such is his confidence in them that he has not only done the work, but also put thousands of dollars in them. The rock certainly shows up exceedingly rich in free gold, and being situated as they are, where abundance of water-power can be obtained easily, should make a valuable property at small cost. W.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLEVELAND.—*Amador Ledger*, July 14: Six miners from Colorado have taken this mine on trial for a month, with the intention of purchasing it at the expiration of that time should the developments prove satisfactory.

MISCELLANEOUS.—The Dane mill is running on some rock from Pioneer district. The Grass Valley gravel claim is proceeding with cleaning up. The water supply is failing fast, and will be barely sufficient to enable them to finish the season's work. An effort is to be made to incorporate the Doyle claim, and to sell enough of the stock to provide working capital to develop the mine. The prevailing opinion is that there is every prospect of this turning out a good mine, and it is hoped the scheme to place it on a working basis will prove successful.

WILDMAN.—Sinking has commenced at the Wildman mine. The dump has been cleaned out and work has been commenced on the solid ground. The calculation is to sink 100 feet and start a drift. As there is a nice little ledge at the bottom now, strong hopes are entertained of an improvement in the new sinking, that will make it one of the best paying mines in the county. The mill will in all probability be kept running during the sinking.

DRYTOWN.—*Cor. Amador Ledger*, July 14: They are still sinking at the Cosmopolitan and everything wears a busy outlook around the property. Teams are engaged in hauling sulphurets from the Keystone and Gover to the reduction works here. They will be able to start up in a couple of weeks. The wood teams are numerous around here hauling wood to the Keystone and Bunker Hill. Mr. Geo. Gates of New Chicago has just completed his new concentrator and got it into successful operation. It promises to surpass anything of the kind now in use for doing rapid and clean work. The sulphurets saved thus far look to be nearly pure.

CLEANUP.—*Amador Dispatch*, July 14: The Goat Shed mine at Pine Grove made a cleanup of 14 tons last week that averaged about \$27 per ton. They are down about 36 feet with the prospect shaft and the ore is improving both in richness and width of ledge as they go down.

Calaveras.

STAR OF INDIA.—*Mountain Echo*, July 11: It is currently reported that the noted Star of India, a quartz mine situated near Smith's Flat, and owned by Curtis & Co., is about to pass into the hands of capitalists. There is an immense body of good milling ore in sight.

ANGELS.—Former residents of Angels who have removed to other parts, and have not seen the old camp for the past three or four years, would be greatly astonished at the wonderful strides it has made in improvements and progress within that period. They would scarcely know the place now. The fact is, however, the town has just commenced to grow, and will, in all probability, loom high above all other mining towns in the mountains within the next three years.

CONFIDENCE.—The furnace at the Confidence mine is completed and the boiler has been placed in position, and the work of putting up the engine will be commenced in a few days. Everything is looking well in the mine and is proving quite satisfactory to the owners.

PLENTY OF MINES.—That many of our valuable mines have already passed into the hands of capitalists is very true, but it is not true—as has been said by some of our wisecracks and would-be mining experts—that there are no mines worthy of notice save those located on what they term the mother lode, which runs through the town. In fact, there was never a greater mistake made, as there are other quartz lodes both east and west of this town, which, if properly developed, are as rich, if not richer, than any of the mines now being worked on this lead. Besides, there are the Carson Hill mines, which are not on this mining belt, and yet they have produced more gold for the amount of labor expended than any other quartz mines in the county. Capitalists who desire to invest their money in mining property, cannot find, anywhere in the country, more desirable sections for that purpose than Angels, Carson Hill, Smith's Flat and Murphys, all of which are situated within a few miles of this town.

Nevada.

A SILVER MINE.—*Tidings*, July 10: Less than two years ago Nevada City mining men were crazy about a reported strike in silver on a property situated 1½ miles south of Banner mountain and owned by the Central Gold and Silver Mill and Mining Co. One "Capt." Channell obtained a 30-day bond of the property and endeavored to enlist Comstock capital in the enterprise, a project Channell did not possess sufficient influence to carry through. Then he claimed that his bond was to endure for a year, and, as the owners had fatuously neglected to keep a copy of the bond, he by his representations kept the property tied up, so at least declared one of the owners to us to-day. Mr. Cooper, who formerly owned a smelting works on Hill's Flat, has a lease of the Central Co.'s property and has shipped several lots of ore to Nevada City and San Francisco for reduction. Thirty dollars a ton—a profitable yield—has been the average return. This ore came from the croppings. A tunnel can be run which will tap the ledge at a point which will furnish several years' work in ore extracting. Below the water level ruby silver is found; above, the metal is carried in black sulphurets. A reduction plant is wanted, for profits are now eaten up by extracting, transportation and other charges, including the working of the ore.

A NEW ENTERPRISE.—*Herald*, July 9: On the Selby Flat side of Manzanita Hill, Jerry Blake has commenced operations for a drift mine. He has started a double compartment shaft, and is now down in the neighborhood of 40 feet. He suspended sinking by hand a few days since for the purpose of putting in pumping and hoisting works. We understand the company doing this work is well fixed financially and is starting for extensive developments. He is now engaged in putting in the ma-

chinery. The pipe to conduct the water is already laid and the water tank is finished. Years ago this ground was rich and there is no doubt much of the same kind yet untouched. These drift mines will yet make this section flourishing.

OMEGA.—The owners of the Omega mine have been for some time working the claim by a hydraulic elevator similar to that used at the North Bloomfield mine. As soon as Scotchman's creek is worked out, the Omega Co. proposes putting in a dam which will hold the tailings from several years' washing. The location is admirably adapted for a dam, which can be built cheaply and so strong that there will be no question about its safety and permanence.

GOOD MINES.—Mr. Aaron, who was in this section a few days since, making observations of the mines in this district, after a visit to the North Banner and Union mines, at Banner Hill, gave it as his opinion that those claims bid fair to make first-class mines. They possess all the requisites, and the formation surrounding them is such that there is almost a certainty of being rich and extensive deposits there.

THE EMANCIPATION MINE.—*Herald*, July 10: The mine known as the Emancipation is located in Willow Valley, near the Deadwood mill. It is owned by Edward Gegan. It consists of three ledges. The one which is now being worked was discovered a few months ago while running a tunnel to strike one of the other ledges. When struck, the owner took out 17 tons of ore which yielded \$495.30, exclusive of sulphurets. There has been another crushing taken out since and it was crushed last week. There were about 20 tons and it yielded \$1623.30, exclusive of sulphurets. The work has all been done within the past two months and mostly by the proprietor himself. By driving from this ledge across to the next, a distance of 153 feet, the owner will strike another ledge in the location, on the croppings of which, 19 years ago, the rock paid \$9 per ton, the ledge being about 18 inches on the surface. The third ledge embraced in this location crosses the second one, and the rock from that paid \$22 per ton 18 years ago, and \$3660 was taken out at that time. The tunnel, when in at that point, will have 140 feet backs. This is a pretty good showing for Nevada district, and shows what is still in store for the energetic prospector.

NO QUICKSILVER.—*Nevada City Herald*, July 12: When passing the Tilton camp, on the Bloomfield road, Mr. Aaron asked for a specimen of the rock being taken out there, and it was given to him by Mr. Tilton. He sent the piece to the State Mining Bureau to see if there were any traces of quicksilver in it. The answer received yesterday was to the effect that it is a very hard quartz, containing oxide of iron, but no quicksilver in any form. Mr. Aaron says if Tilton has quicksilver up there he does not know the kind of rock that contains it, for he selected the piece assayed himself.

THE RAINBOW.—The reported rich strike at the Rainbow mine, at Alleghany, must be correct, as H. K. Noble, one of the plucky owners, who has staid it through thick and thin, went up this morning in response to a telegram announcing the strike. When Noble got busted in stocks he went to the mine and with drill and hammer went to work with his own hands. He has put up money for development work ever since. His persistence is deserving of reward.

OMAHA CONSOLIDATED.—*Tidings*, July 12: In addition to 20 tributaries and contractors, 40 miners are employed at the Omaha Consolidated at day's pay. The ten-stamp mill is now running on company rock of fair grade and it is believed the run will be continuous. This applies to the ore from the Omaha shaft. In Lone Jack shaft the water is being steadily lowered and of course more or less timbering being done. At a point 320 feet from surface two shafts were discovered, but these were found to consolidate at a depth of 420 feet. The water is at present just below this point and the shaft is in very good condition. A week ago a drift to connect the Omaha and Lone Jack shafts was started from the Omaha. This will be 150 feet in length and is calculated to penetrate the Lone Jack at a depth of 400 feet.

Plumas.

DEVELOPMENT WORK.—*Greenview Bulletin*, July 11: The Crescent mine is being worked steadily, and it is reported that satisfactory results are obtained. The Indian Valley runs regularly. Mr. Prentiss gives it his personal supervision. It is understood that the ore is yielding a good profit. Work continues on the Drury, the ore being crushed at the Arcadia mill. The ore body in the mine is simply immense, and is paying. Geo. Standart continues working the Pacific. Fifteen stamps of the Kettle mill have been kept busy, and the ore is supposed to be paying well. At Wolf Creek, development work is progressing. It is intended to put up a mill this fall. The Sunnyside mine is said to be paying well at present, and quite a number of men are employed. On a bar in the river below the Sunnyside mine, a company of Chinese, a few days ago, obtained a nugget weighing 3300. The claim is rich. The Glazier drift mine on the North Fork is paying handsomely. Wm. Roedde and August Goebel are reported to have a rich surface claim on Rush Creek.

San Diego.

SINKING.—*Julian Sentinel*, July 13: On Monday morning work was commenced sinking a shaft at the new Magazine mine, the property of Messrs. J. Marks and S. L. and Duncan Ferguson. At present they have gone down about 11 feet, and good prospects are reported.

HIDDEN TREASURE.—F. M. Carrell, J. M. Parks, G. R. Moore and E. H. Lee are working the Hidden Treasure mine at Banner under lease. They are taking out some very fine rock.

Sierra.

NEW MILLS.—*Sierra Tribune*, July 14: At Scott's Flat, about six miles below Alleghany, parties are engaged in building a 40-stamp mill upon what is known as the Red Chief mine. In the same vicinity another party is putting up two Huntington mills.

STRIKE AT THE RAINBOW.—*Nevada Transcript*, July 14: The town of Alleghany, Sierra county, was wild with excitement Thursday over a strike in the Rainbow mine at Chips Flat. The richest kind of ore is said to have been developed by the new tunnel, which taps the ledge at a much greater depth than it has ever before been worked. The Rainbow has in years gone by produced some of the richest quartz ever extracted from any mine in Cali-

foria, but before attaining a great depth the pay-chute was lost and subsequent operations have been confined to prospecting for it.

MARTIN MINE.—*Nevada City Herald*, July 9: W. G. Benallick & Co. own a very promising quartz ledge about two miles east of Sierra City. It is a north and south ledge; is about seven feet in width and the rock shows free gold throughout. It is heavily charged with iron sulphurets, which bear gold. There is 100 tons of good ore on the dumps. The developments thus far are a shaft 110 feet deep and a tunnel 75 feet in length. The ledge lies between porphyry and slate. Free water for power is abundant, and timber enough for all purposes belongs to the property. Mr. Benallick is superintendent. The location of the mine is such that it can be worked by tunnel for years.

TUNNEL.—*Mountain Messenger*, July 14: H. Lafarie was down from the Pliocene shaft, Tuesday, and reported the pumps in good running order, and the boys blasting merrily away at the new Extension air-line tunnel, in near 2000 feet, with rather tough rock in the face.

ALASKA.—*North San Juan Times*, July 13: The Alaska mine at Pike City is steadily increasing its crew of workmen. Monday last several men passed through our town en route to Pike, from Nevada City and down the ridge. Who said the Alaska was no good?

Siskiyou.

RIVER CLAIMS.—*Yreka Journal*, July 14: The McConnell claim at Klamath river is now being worked with good success, rich pay gravel having been found at both derricks. We hear that gravel hoisted by one of the derricks paid 19 ounces in one day lately. The Centennial Co. has an open cut down nearly 40 feet, or within 15 feet of bedrock, and expect to realize big pay when ready to bottom up. The claim is being worked in the most systematic manner by Marsena Mott, one of the best river miners on the coast. The Chinese Co. working the claim near the Fort Jones claim is taking out big money this season. Another Chinese claim just below the above is also paying well. They took out 100 ounces in a very short time after reaching bedrock lately, a distance of 70 feet from surface of river. This claim pays from 20 feet below surface to bedrock, hence open cuts are more successful than drift mining. The Phil Mott claim, further down on the Klamath, is also being worked with good success. Other river claims are being industriously worked both below and above Humburg creek, on Klamath river, and considerable dust is brought to Yreka every week for general circulation.

QUARTZ.—Messrs. Malow and Allison of Scott valley have discovered a rich ledge of quartz beyond the summit of Humburg mountain, above the old Eliza ledge, which prospects exceedingly well, all the quartz pounded out in a mortar yielding rich pay. The Hamilton Brothers & Humphrey, of Fort Jones, have also discovered a ledge at summit of Humburg, on north fork, which prospects very rich. We learn that a party of prospectors discovered an exceedingly rich quartz ledge in the Siskiyou foothills, last week, between Empire creek, on Klamath river, and Hungry creek.

Trinity.

NEW RIVER.—*Humboldt Standard*, July 7: We have received a visit from John S. Thomson of New River. He tells us that there is a steady flow, exceeding \$10,000 in gold bullion monthly, from this camp, which is handled mostly at the Selby Smelting and Refining Works and Price's assay office, San Francisco. The Uncle Sam mill is running on ore from the mine of the same name and doing custom work. Colgrove & Clement's mill—three stamps—is kept busy on ore from the Excelsior and Mountain Boomer mines. The Thomson & Smith mill—six stamps, double battery—keeps three stamps busy crushing ore from the Carrie mine, and three running on custom work. Sherwood's arrastra is kept at work on ore from the Sherwood mine. The Mountain Boomer mine has cleared up over \$10,000 thus far this season. The ore averages \$80 to the ton. Six men are kept busy working in the mine and an equal number about the mill. The Excelsior has produced over 200 tons of ore this season which averaged \$30 to the ton. The mine has six men employed getting out rock, and there is a good dump now ready for crushing—the mill not being able to work up the rock as fast as it is taken out. Besides these regular producers of bullion, much ore is brought from mines in course of development. Al Campton of Rohnerville has a mine on Pony creek, and has been getting some rich rock worked up at the Thomson-Smith mill. His mine prospects well. A Yocum of Arcata has been having ore from the Little Gem mine worked at the same mill, and it shows well. The Hunter mine, belonging to Clement & Co., has been getting good rock worked at this mill. The mines owned by Billy Mills, Capt. Buhne, D. R. Jones, all Eureka's, have also had good rock worked at the mill. Several other mines are showing splendid prospects, but as yet are only spoken of as outside mines. It is not only New River, but for miles in all directions new prospects are being opened up. Especially is this true on Knownothing creek, 12 miles northwest of New River, where Hansen & Raddelfinger have opened up a mine, and the day our informant left New River, it was reported that Bennett and his partner had found a rich ledge on the opposite side of Knownothing creek, from the mines of Raddelfinger & Hansen. Twenty miles east of New River, on East Fork, Pearson of Junction City is putting in a five-stamp mill to work ore from his mine. Many capitalists and mining experts are in this section looking up good gold prospects. Mr. Thomson says that a careful estimate of the output of bullion from the New River mines shows that over \$2 has been taken out for every \$1 invested in the camp. This is no idle assertion; it can be substantiated by figures.

Tuolumna.

CLOSED.—*Sonora Democrat*, July 14: The Hyde mine is closed down for a time, owing to some disagreement respecting the conditions of the bond, held by Messrs. Spencer and Green. It is expected that the mine will resume work shortly.

GREAT WESTERN.—Messrs. Paul Morf, Eugene Abbott and F. Cullers are opening their mine, the Great Western. It is situated about 15 miles from Sonora in a northeasterly direction and about six miles from Confidence in a westerly direction. The parties are running a tunnel on the lead, and by those who are judges of quartz we are told that it is not at all refractory and that it will yield readily to simple amalgamation process. It is thought the lead

will pay from \$20 to \$25 per ton. It runs obliquely across the country rock, which is slate, and its course will necessarily bring it in contact with other quartz lodes and with feeders.

DUTCH.—Messrs. D. Lucas, Geo. Kattman, James and Chas. Fitzgerald purchased this week a most valuable piece of property at Quartz mountain. It is known as the Dutch mine and is the north end of the Heslep and App mines. Both of these mines coöperate until at last they unite in the above lode.

MILL.—Although the Stanislaus Tunnel & Mining Co. intend erecting large works on the Stanislaus river in the near future, yet they are not going to hastily conclude on the details of machinery. Mr. McCann thinks of furnishing the mill with the new Blanding rock breaker which is giving such general and signal satisfaction.

LEASED.—Messrs. D. W. Cameron and A. A. Grant have leased the lead belonging to Mark Hughes in the southern part of Sonora and are going vigorously at work. The lead is considered one of the best in this district. The lode is, considering its pocket nature, a large one, and is attended with all of the favorable conditions.

PLACERS.—The company which last year made arrangements to work extensive placers below Reynolds' Ferry on the Stanislaus river is now following up the preparations with all possible dispatch. They are building a large wheel, and as soon as the river subsides, which it is now doing rapidly, it will be turned into the long tunnel.

TUTTLETOWN.—*Tuolumne Independent*, July 14: Mr. Fischer is sinking a new shaft on the Leonard mine; it is down 60 feet, and shows a ledge 6 feet wide, prospecting well in free gold. He is using the Ritchie mill to crush the ore. Fred Sutton is working the Grass vein of the Ames mine, crushing the rock at the Patterson. The men who bonded the Long Gulch claim are well satisfied with the fine ore that is coming out.

NEVADA.

Central District.

MILLIONAIRE ORE.—*Silver Star*, July 16: A. H. Ruse sent out about nine tons of second-class ore from the Millionaire mine to J. F. Clark's concentrating works on the Humboldt. It produced nearly half a ton of concentrates which assay \$702 to the ton. The ore carries \$58 per ton in chlorides, which is saved by pan process, besides the concentrates.

Eureka District.

SILVER.—*Eureka Sentinel*, July 14: A streak of rich silver ore has been found in the Alturas mine, on the northern ridge of Prospect mountain, near the Eureka Con. mine. It is said to go 284 ounces per ton. The discovery was made in a shaft about 70 feet below the surface.

Hawthorne District.

THE EVENING STAR.—*Walker Lake Bulletin*, July 11: The present lease of the Evening Star mine will expire on the 18th inst., and the lessees are determined to "make hay while the sun shines." They expect to have between 1200 and 1300 sacks of ore ready for shipment before the lease expires. This will amount to about 70 tons. Frank Thorne, one of the lessees and part owner in the mine, estimates that the rock will mill over \$200 to the ton. This is no wild estimate, but is based upon frequent assays and daily borings. When it is taken into consideration that less than \$7000 has been expended on the mine so far, the result is most cheerful. Six cars have been engaged to transport the rock to the Briggs mill, near Silver City. A representative of California capitalists made a tour of inspection through the mine on Saturday, with a view of purchasing. The owners are not over-anxious to let go, however, as they are satisfied they have one of the best mines in the district.

Lodi District.

GOOD RESULTS.—*Belmont Courier*, July 14: Alfred Welsh continues to work the Illinois mine¹ Lodi, Nye county, with very flattering results. At a distance of 200 feet from the mouth of the tunnel a winze has been sunk 80 feet which has developed an immense body of high-grade ore that will work over \$400 per ton. Four men take out a ton of ore very easily per day. It is smelting ore—carbonate and galena—and is shipped to Reno for treatment. The Silver King—an extension of the Illinois—is being worked by James Graham and A. Farrington. A shaft has been sunk on the ledge to a depth of 114 feet and shows ore in its bottom that assays \$128 in silver and \$19 in gold per ton. A tunnel is being run which will tap the ledge at a depth of over 200 feet. This tunnel is now in 200 feet and the ledge will be cut when it is run about 50 feet further. The indications are considered favorable for a big body of ore. Streaks of mineral are coming in. The chances for a live camp at Lodi are remarkably good.

Seligman District.

PROGRESS.—*Eureka Sentinel*, July 14: We learn that the concentrating works at Seligman are running constantly and successfully, except as to the dust, the separation of the metal from the gangue of which is somewhat tardy. This is merely one of the contingencies that are seldom avoided at the commencement of a new enterprise. Several wells have been sunk at Seligman and the supply of water has been considerably increased. A true vanner concentrator will be set up in the machine-shop for the purpose of treating the dust and handling it with greater expediency. If it proves successful, several more will be added. In the meantime the work of exploration in the Pursell series of mines continues with unabated energy. A large amount of ore is exposed in the tunnels and inclines, those on the Pursell No. 2 mine looking the best at present. Stopping has commenced in good earnest. The working force has been increased to 177 men, besides 22 Chinamen that are employed.

Morey District.

IMPROVEMENT IN THE VEINS.—*Eureka Sentinel*, July 14: We learn that a number of tributaries are at work in the mines of Morey district, Nye county, and we are reliably informed that they never looked better than they do at present. The veins are true fissures, which cross the country in an east and west course, at a distance of about 1000 feet apart. The mountain in which they are situated is very steep and rises precipitously from the foothills. The mines have been opened principally by tunnels entering the foothills and following the veins. The country

rock is granite, which, for a considerable distance along the line of these tunnels, is very much broken up and the veins are displaced at several points, but the tunnels, gaining great depth as they are driven westward into the heart of the mountain, are now entering a more permanent formation, where the veins being consequently undisturbed are likewise showing a more permanent condition as greater depth is attained. Messrs. Moore & Shendel have lately been working the Magnolia mine under lease, and are developing a fine ledge of ore, a part of which is high grade and easy of reduction. They have just completed a shipment of 36 tons to Salt Lake, which, by careful sampling on the dump, shows a value of \$300 to the ton, about \$10 of which is in gold. The low-grade ore, which contains blackjack and is of a rebellious character, is not touched, but the mine, under the conditions of the lease, is kept open, in order that this material can be utilized by the owners at a future day, when it can be mined profitably to under improved facilities. As the saying goes, "blackjack rides a good horse," and the presence of this material is regarded as a good augury.

Taylor District.

CLOSED DOWN.—White Pine News, July 14: Last Saturday morning, under orders from Supt. Carothers, the Argus series of mines were closed down and all hands discharged. The following day Mr. Underhill came up and paid off. The order came unexpected, even to Mr. Underhill, who represents the Eastern owners, or five-eighths of the property. Since the company commenced operations here four years ago they have taken out nearly a million dollars gross, with crust of working appliances and a management more fickle and changeable than the lunar phases. It is true that this vast amount of money was spent in working the property and paying for it, and little, if any, found its way into the owners' pockets. As it is a private company, that always promptly met its obligations, neither the press nor public had any right to criticize its mode of operation, and we have refrained from doing so. The Argus mines after four years' work have been barely scratched, certainly not prospected, and all the indications point to extensive mineral deposits that when economically extracted will keep their mill running for a score of years to come.

Tuscarora District.

NAVAGO QUEEN.—Tuscarora Times-Review, July 14: Northeast drift, 200-foot level, continues to look favorable.

BELLE ISLE.—The slopes are yielding about as usual.

NAVAGO.—The 350-foot level slopes produce their usual amount of ore.

FOUND TREASURE.—Small shipments of ore are being made to reduction works.

DEL MONTE.—No. 2 crosscut north from tunnel drift extended 30 feet, passing through seams of high-grade ore.

NORTH BELLE ISLE.—North drift, 400-foot level, extended to feet; the vein in the face is increasing in width and the ore is very high grade. Everything is running smoothly in and about the mine. The grade for the concentrators is finished and the mechanics have begun on the buildings.

GRAND PRIZE.—Preparations for the extraction of ore, such as timbering, starting chutes, etc., on the 200-foot level drifts, are being pushed as much as possible. Slopes above the 300-foot level are looking and yielding better. A night crew has been put on at the hoisting works to lower the water, and as soon as the winze on the west vein, 300-foot level, is drained, the rich ore left showing in the bottom will be followed on down. Good progress is being made on repairs at the mill.

COMMONWEALTH.—East crosscut from south drift, 100-foot level, has been extended eight feet, passing through a good grade of ore; have not reached the footwall. Intermediate drift from top of No. 8 upraise has been extended six feet, all in high-grade ore assaying \$556 per ton. North intermediate, west of the shaft, is showing extremely rich ore. The east lateral drift, from main south drift, has been extended eight feet, there being four feet of \$200 ore in the face. The mill was started Monday and is doing good work. Battery pulp assay, \$474 per ton.

NEVADA QUEEN.—The 400-foot level of North Belle Isle is within six feet of Queen line. The ore is improving in width, very high grade and carrying a large per cent of gold. The work on the slopes in the 350-foot level is progressing nicely, the ore opening up well—even better and larger than was expected. South drift from bottom of the winze, 90 feet below the 200-foot level, is being cleaned out and put in shape for stoping. The ore is looking well all along the drift and is high grade. The 150-foot level drift from Commonwealth has been extended five feet; the ore is improving. Average assay from car sample of the week—125 tons dumped in North Belle Isle orehouse—\$212 per ton; 200 tons on concentrating dump, \$30.23 per ton.

Washington District.

DE LONG MINE.—Belmont Courier, July 14: It is expected that considerable work will be done in the De Long mine, San Juan canyon, Nye county, this summer. The ore is of a smelting character and can be profitably reduced near to the mine, as wood and water are plentiful and cheap.

ARIZONA.

THE SILVER KING CO.—Silver Belt, July 7: We learn from a reliable source that the affairs of the Silver King Mining Co. are in a serious plight. The company's checks were allowed to go to protest for two successive months, and an arrangement was finally effected whereby the Bank of California takes up the King Co.'s paper and issues its own notes payable several months hence. An assessment, the first, has been levied upon the stock, and shares have declined to \$1. We hope the company's affairs are not so bad as these reports indicate. The Silver King mine is famous, has paid 60 dividends aggregating \$2,000,000, and has always been honestly and intelligently managed, although the management has not escaped the charge of extravagance. The last annual report of the superintendent was very favorable, suggesting large ore reserves. The company has been at heavy expense during the past year for additions to its plant and in exploiting its mine, and it is not improbable—and we certainly

hope such will be the case—that increased ore production and the resumption of dividends will soon follow. The company is now promptly meeting its obligations.

THE OLD GUARD.—Tombstone Epitaph, July 14: The financial embarrassment of the company has been caused in England, where stock subscribed has not been paid for, and is not traceable to the management of the property here nor to the directors, who have ably discharged their duties. We have the assurance of Mr. Williams that every dollar of indebtedness will be paid in a few days and work resumed as per agreement made with him while in London. More than that, when the mill starts up custom ore will be purchased at living prices, and if the business justifies additional stamps they will be immediately added.

A GRAND COPPER PROPERTY.—Florence Enterprise, July 7: A representative of the Enterprise visited the Lake Shore copper mines in Casa Grande district, and he places his views of it in the following language: "Cochise county has her Bisbee and Copper Queen; Gila county has her Old Dominion; but Pinal county can well boast of a copper property that is destined to keep lit her smelter fires for years to come. The Lake Shore is 23 miles from Casa Grande on the Southern Pacific railroad. This property has a large amount of work done on it, and in no instance has a shaft or drift been run but what large bodies of ore have been encountered. The Old Dominion under the greatest disadvantages has proved the life of Gila county, the Copper Queen of Bisbee is upon a career and basis so prosperous that they have raised their workmen's wages from \$3 to \$5.50 and informed their employees that their money could be drawn upon any day that they needed it, and now the mine itself is building a branch railroad to connect with the Southern Pacific road. This itself is a standing manifest to the degree of prosperity which our copper properties will yet advance us. That smelter fires will be kept ablaze by the Lake Shore for years to come is a foregone conclusion; that they have not been ablaze before this must be attributed to the modesty and indifference of the owners, Messrs. Aichison & Traut, who have seemed indifferent whether the outside world were cognizant of this great wealth being in their possession. During the year 1883 \$100,000 cash was asked for this property. There are 1000 tons on the dump and 300,000 tons in sight."

COLORADO.

ORE.—Georgetown Courier, July 12: Sixty-seven cars of ore were shipped from Georgetown during the month of June. A contract has been let for the remainder of the machinery at the Florence tunnel. The entire plant, with buildings, will cost nearly \$15,000. It is expected to have the machinery in operation by the first of August. Mr. Colburn figured up the development on the Sporting Times property a few days ago, and found he had 1362 feet of adits, drifts, winzes, etc., which, together with the patents on the several lodes, has cost him \$14,346. He intends to commence a 60-foot shaft shortly on an eight-inch vein of \$60 ore.

DAKOTA.

LOOKOUT.—Deadwood Pioneer, July 13: As was stated a few days ago in the columns of a Rapid City paper, a fortunate discovery has recently been made in the Lookout, one of the best developed claims in the group owned by the company. The discovery, due in a measure to accident, was made by cutting through some eight or ten feet of barren rock, before supposed to be a wall, but which proved to be a horse, and finding not only that the ore body is much larger than the owners believed, but that this portion of it at least is of much better grade than that on which the mill has been running. Twenty stamps have been dropping for ten days; the other 20 stamps, making 40 in all, were set in motion Tuesday. The mill is run by water-power, and the ore brought to it by a chute, so arranged that a loaded car descending to the mill furnishes motive-power to haul the empty car up the incline to the mine. Everything is conducted on principles of the strictest economy. The total cost for mining and milling is rather under than over \$1 per ton. The ore is said to average, milling test, \$2.12½ per ton. An apparently inexhaustible body is in sight, and the mine promises to prove a bullion-producer for many years to come.

REDUCTION WORKS.—Plans and specifications, expected several days since for the leaching plant, have not yet been received. The reason assigned was unavoidable delay in execution of them, owing to the absence from New York, at the time Messrs. Hickok & Clark reached there, of the pattern-maker at the foundry from which machinery has been ordered. President Franklin, yesterday, however, received a telegram announcing the drawings were at length complete, and that Mr. Hickok would last evening start from New York with them.

IDAHO.

ORO FINO.—Idaho Avalanche, July 7: The Oro Fino Mining Co. is not only pushing work under the superintendency of Mr. M. F. Leech on the Oro Fino and Sinker mines, but also the grading for the 50-stamp mill which will be erected on the east side of town as soon as the grading is completed. A survey for the tramway to run from the Oro Fino mine to the mill at this place is being made. When the tramway shall have been completed, it will be about 1½ miles long. While excavating is being done, and the mill is being built, the company will be developing the mines and extracting ore. At the present time work is progressing rapidly, and good ore is being extracted from the Sinker lode. The Oro Fino Co. has enterprise, and money to back its undertakings, and before the year shall have passed will be shipping bullion weekly from its valuable properties.

STRUCK IT RICH.—The upper crosscut struck the Sullivan & Phillips lode on Tuesday last, and although a sufficient amount of work has not been performed to fully develop the extent of the ore body, it is known to be rich, as specimens shown us fully verify. Drifts will be started each way from where the crosscut intersects the vein, and the mine opened as rapidly as possible.

ORE AND BULLION SHIPMENTS.—Ketchum Key-stone, July 14: The Ramshorn Mining and Smelting Co., at Bayhorse, has shipped through the Ketchum East Freight Line, since May 7th, 13 carloads of

base bullion, weight 438,247 pounds, and one carload of Ramshorn ore, 27,253 pounds, consigned to the Pennsylvania Lead Co. at Mansfield, Pa. A. J. Crook & Co., of Clayton, have shipped during the same time 11 carloads of bullion, weighing 249,463 pounds, and 9 carloads of Skylark ore, 236,805 pounds. Thus the base bullion shipments from Custer county, via Ketchum, in 60 days, were 29 carloads weighing 687,710 pounds, and the total ore shipments, 264,057; total ore and bullion, 951,767 pounds, or about 106,000 pounds per week, all of which has been promptly delivered to the railroad at this point in about that amount weekly. Most of this bullion was on hand when shipping began and consequently the shipments to date have been greatly in excess of the current yield of the works, especially in the case of the Ramshorn Co.

MONTANA.

HELENA SMELTER.—Billings Gazette, July 7: The work on the Helena smelter is progressing with all rapidity, and it is hopefully expected that the great works will be prepared to receive ore by the first of December. About 40 men are now employed on the site and on the various necessary outbuildings, besides 18 teamsters who operate 2-horse teams. Prof. Kahl is superintending the work, but James L. McKay has the operations under his immediate direction. The men are at present engaged in leveling off the ground for the site of the buildings and in the filling and cutting of ground for the line of railroad which is to be used to carry the material to the buildings, and the appearance of the place is one of bustle and business. As soon as the work is far enough advanced, the Northern Pacific proposes to lay an elaborate system of tracks, which will run to and through the buildings.

WEST GRANITE.—Phillipsburg Mail, July 7: In the Butte crosscut the condition is unchanged from last week, with the one exception of there being a little more water than heretofore. The contractors are making a little better progress than for the last two weeks. The tunnel header is now in 795 feet, with the face of the working showing a hard, flinty granite country rock. Work in the east drift on the 100-foot level of the Rattlesnake still continues, with no further indications to report. A crosscut north and south in the drift in the Fraction ground is being talked of in order to thoroughly prospect the country.

HATTA.—From E. D. Holland, who returned last Saturday from Dunkleberg, we learn that the incline shaft on the Hatta will be completed to the old workings in about three weeks. The old drift on the vein will be continued and stoping will follow. The ore is to be shipped to Omaha immediately on extraction. From the same gentleman it is learned that work has been suspended on the Little Joe and Silver Bell claims, lately worked by Scott & Hower.

JEFFERSON COUNTY MINES.—Butte Inter-Mountain, July 14: In the vicinity of Wickes a large amount of activity in mining is being shown. Three new steam hoists are being erected at the present time—one on the Bluebird, owned by Malspugen & Co.; one on the Overland, owned by Gunnersole & Co.; and one by the Boulder Chief Mining Co. The Evening Star, owned by Briscoe & Co., will start up in a short time, as they are now busy getting things in shape. A St. Louis Co. is placing a 60-ton concentrator close by to work custom ores, and this, in connection with having two railroads near, is encouraging the owners of prospects to make a struggle to do something for themselves. The Placer companies at Radersburg are running their giants, while the water season lasts, and from previous records will net good results. In quartz the Keating mine is being worked steadily by two companies. The Toston Co. has the portion owned in former years by Blacker, and John Keating is running his own interest. The ore is mostly shipped to the Toston smelter. A 10-stamp gold-mill is running on some of the ore from near the surface. There is quite a number of very promising prospects on Uncle Johnnie's gulch, some three miles from Radersburg, and considerable development has been done here during the past winter. In the Dogtown mines things are just now at a standstill. The Blackhawk mine has a large amount of high-grade ore sacked and ready for shipment. In the Indian creek district a few men are working in the placers. Wheeler Kimberland and partner have lately struck some very fair pay; \$25 to \$30 to a six-foot set of timbers is not bad. The Little Giant mine that has been worked for the past 18 or 20 years is yet panning out better than wages to the owners. This is certainly one of the most continuous of Montana gold quartz mines. It was always small (from four to eight inches of ore is all they have), but they work it right along year after year. It runs about \$50 a ton. John Murray has a mine on the right-hand fork of Indian creek, called the Iron Mask. He has shipped some very fair ore from it, running about \$100. He has a shaft down 200 feet on this property, and it promises well. Frank Wells of Radersburg has an extension on this same lead called the Lookout, with a shaft 50 feet deep and showing some good ore. A large amount of prospecting is now going on in this vicinity. A Helena company has 12 men at work on a prospect that is not far from the Old Jaw-Bone mill (one of the old-time failures) that shows some very handsome ore. John Murray is cleaning up a very handsome amount from his old Hog Em hydraulic mines. The continued wet weather will give him a good season's water to operate with. The old Iron Age mill on Beaver creek is stamping away on ore averaging \$10. This, with its facilities for working, will net the owners a handsome monthly dividend, and they have quantities of ore in sight.

RICH COPPER SAMPLES.—Helena Herald, July 7: Some rich specimens of copper ore are exhibited in the city by Col. Hawkins, an experienced California miner, whose recent explorations have extended to newly developing mineral districts in Western Montana. The ore samples referred to come from the Home mine in the Bitter Root country. The discovery claim is said to show a vein nine feet in width. Col. Hawkins, in his discoveries, has also uncovered very promising veins of galena and gold ores. He is in Helena, having assays made of the samples he bears with him.

SYDNEY CON.—The work of pumping out the mine is still going on with success. Supt. Gable gives it as his opinion that by the first of the week three shifts of men will be employed and at work sinking the shaft.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JULY 10, 1888.

385,985.—STATION INDICATOR—Mark Anthony, S. F.
385,696.—CHURN—J. C. Cole, Brents, W. T.
385,793.—LATHIE CHUCK ATTACHMENT—Findlay Cumming, S. F.
385,701.—RAILWAY RAIL—F. Euphrat, S. F.
385,859.—CEMENT—I. C. Hatch, Santa Cruz, Cal.
385,812.—DREDGER—Knight & Lambing, Sutter Creek, Cal.
385,936.—DENTAL ENGINE—W. A. Knowles, Alameda, Cal.
386,024.—CAR BRAKE—L. Nicholson, S. F.
385,780.—INSTRUMENT FOR PLOTTING CONTOURS OF GROUND—M. Sturud, Seattle, W. T.
386,046.—LAMP SHADE—Genevieve Watson, Seattle, W. T.
386,049.—RAILWAY SIGNAL—G. H. Wright, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DREDGING MACHINE.—Samuel N. Knight, Sutter Creek, and Isaac P. Lambing, Ione, Amador county. No. 385,759. Dated July 10, 1888. This patent covers an improved dredging bucket and mechanism for opening and closing the same. It is intended to be applied to the machine illustrated in the MINING AND SCIENTIFIC PRESS of July 14, 1888, for deep-creek and river-bed mining. This bucket is very strong and is operated by steam. When closed the bucket forms a nearly tight and perfect hemisphere, and the whole apparatus, with its load, is lifted by the crane and transported over the dump. By constructing the bucket-sections of the hemispherical form and with the sharp points, their effectiveness in digging the material is very great.

LATHIE-CHUCK AND ATTACHMENT FOR TURNING TREENAILS.—Findlay Cumming, S. F. No. 385,793. Dated July 10, 1888. In the turning of treenails or similar articles in which it is desirable to do the work expeditiously, considerable delay occurs because it is necessary to stop the lathe after each one is finished and remove it and place a new one in to be turned, after which the lathe must be started. This invention consists of a chuck by which the square pieces from which the treenails are turned can be instantly seized and released while the lathe is in motion, and an adjustable traveling cutter by which the square stripe are turned into cylindrical form, with the exception of the head, which is held in the chuck, said cutter being self-adjusting, so as to adapt itself to strips, which may be warped or not, perfectly straight.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

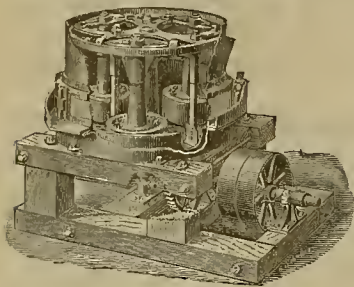
Confidence, 16, \$18,183; total to date on July account, \$36,282; Oest, 15, \$12,000; Iron Mountain, 6, \$16,000; Mt. Diablo, 14, \$8347; Blue Bird, 14, \$46,336; Pollock, 14, \$8896; Lexington, 14, \$24,336; Moulton, 14, \$11,120; Hanauer, 12, \$2500; Germania, 12, \$2279; Hanauer, 13, \$1800; Pollock, 10, \$9040; Cons. California and Virginia, 14, \$68,806; Richmond Oons., 14, \$17,739; Eureka Cons., 14, \$12,730; Hale and Norcross, total for June, \$149,365. Last week the shipments from Salt Lake were as follows: Welle, Fargo & Co., \$82,140; McCormick & Co., \$34,780; T. R. Jones & Co., \$16,728.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco: OCCIDENTAL CONSTRUCTION CO., July 14. Object, to build, maintain and operate gas, electrical and water works. Directors—L. L. Bromwell, General W. Lynch, John D. Yost, H. Wadsworth and M. S. Newell.

MUSSEL SHOUGH CANAL CO., July 14. Capital stock, \$200,000. Object, acquiring and selling water rights and operating canals for irrigation purposes. Directors—Charles L. Lind, George H. Malter, William H. Jordan, Franklin P. Bull and Lee W. Mix.

THE EDUCATIONAL CONVENTION.—San Francisco has received several thousand visitors this week, who are in attendance on the National Educational Convention. These teachers come from all parts of the United States, and many of them will spend several weeks in California visiting the different points of interest.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON,

MANUFACTURER OF

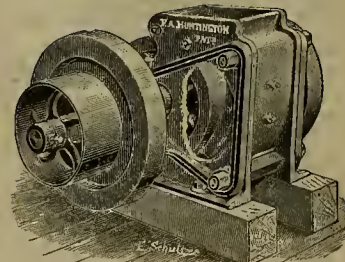
**Centrifugal Roller Quartz Mills,
CONCENTRATORS AND ORE CRUSHERS,**

Mining Machinery of Every Description,

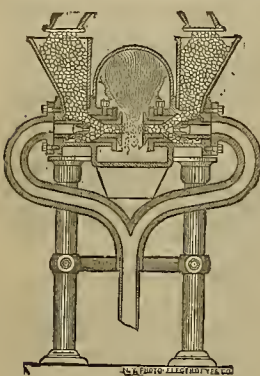
Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.

No. 45 FREMONT STREET, - - SAN FRANCISCO, CAL.



ORE CRUSHER



Sectional View of Pulverizer.

PNEUMATIC PULVERIZER.

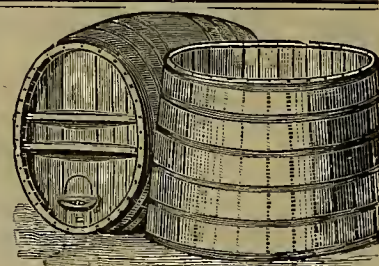
The principle of pulverization consists in the employment of two

POWERFUL OPPOSING CURRENTS

Of dry super-heated steam, so arranged that they continuously charge themselves with crushed or granulated material, and by the great force and velocity of the steam currents the minerals are dashed against each other with such power of concussion as to cause the hardest ores to be pulverized to any degree of fineness desired. The high temperature of the super-heated steam currents employed, through which every minute particle of ore must pass, causes them to become very hot and dry, which produces a beneficial effect upon Sulphurets and ores containing rusty Gold. The light weight and simplicity of construction of the Pulverizer, the extremely small and inexpensive wearing parts, are the WONDER and SURPRISE of all who witness its operation. The Company is prepared to furnish complete plants for pulverizing

10 TO 200 TONS PER DAY,

Including a Sectional Steam Boiler supplying all the power required.

PNEUMATIC PULVERIZER COMPANY,**2 and 4 Stone Street, NEW YORK.****Write for Particulars.**L. F. HOLMAN, Pres't.
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MACHINERY.FRANK & CO.'S WOODWORKING
MACHINERY.NEW HAVEN MANUF'G CO.'S MA-
CHINISTS' TOOLS.BEMENT & SON'S MACHINISTS
TOOLS.

BICKFORD'S POWER DRILLS.

BLAKE'S IMPROVED STEAM
PUMPS.

WEBBER CENTRIFUGAL PUMPS.

PERIN BAND SAW BLADES.

STURTEVANT BLOWERS AND
EXHAUSTS.

SHIMER MATCHER HEADS.

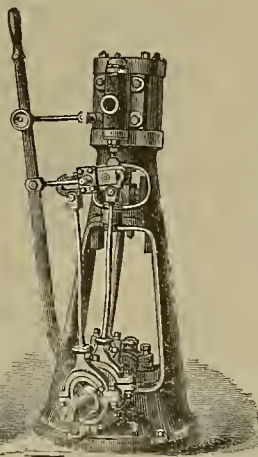
BRANARD MILLING MACHINES.

TURBINE WATER WHEELS.

BRADLEY CUSHIONED HAMMERS

MASSEY'S STEAM HAMMERS.

SCHLENKER'S BOLT CUTTERS.

HOLLOWAY FIRE EXTINGUISH-
ERS.**YACHT ENGINES.**WILLIAMSON BROS' HOISTING
ENGINES.ATLAS ENGINE WORKS ENGINES
AND BOILERS.PAYNE'S VERTICAL AND HORI-
ZONTAL ENGINES.

OTTO SILENT GAS ENGINES.

EMPIRE LAUNDRY MACHINERY.

PICKERING ENGINE GOVERNORS

JUDSON ENGINE GOVERNORS.

TANITE CO.'S EMERY WHEELS
AND MACHINERY.

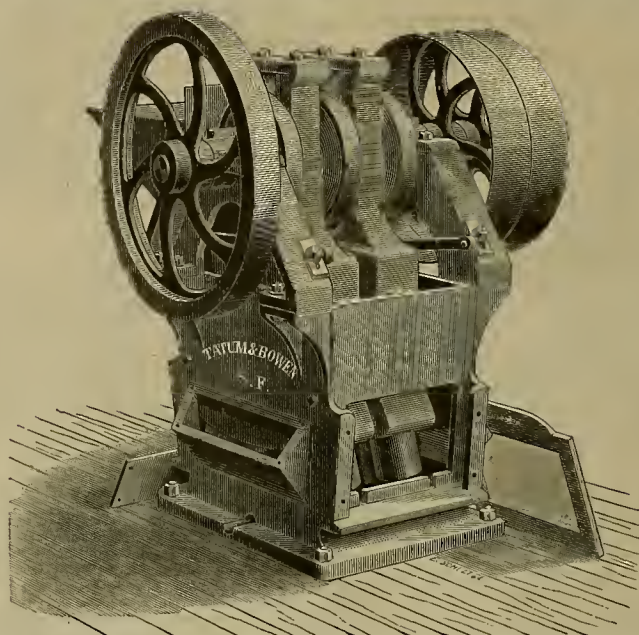
NATHAN AND DREYFUS OILERS.

KORTING INJECTORS AND EJEC-
TORS.

DISSTON'S CIRCULAR SAWS.

NEW YORK BELTING AND PACK-
ING CO.'S RUBBER GOODS.

LANE AND BODLEY SAW MILLS.

H. W. JOHNS' ASBESTOS PACK-
ING, PAINT, ETC.**— THE —
DOUBLE "ECONOMIC" STAMP MILL.**

We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the rapidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in any other mill to do the same amount of work.

The Mortar has screens at both ends, giving ample discharge. There are no cams or tappets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

TATUM & BOWEN,

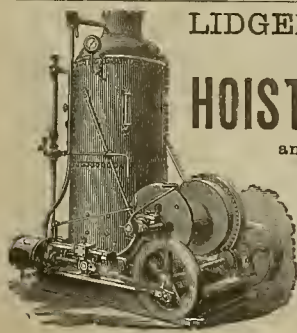
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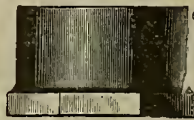
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Adamantine Shoes, Dies and
CRUSHER PLATES,
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Chrome Cast Steel for
Rock Drills, Etc.



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MANUFACTURERS' and PURCHASING AGENT.

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MINE and MILL SUPPLIES.

ADAMANTINE SHOES AND DIES.—Guar-
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Orders solicited, subject to above conditions.
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Is in operation in leading smelting works and mills.

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—AND—

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TRAMWAYS.

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And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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Under Chamberlin Patent.

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Working Tests (practical) Made.

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Mining Engineers and Metallurgists.)

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Ores Sampled and Assayed, and Tests made by my Process.

Assaying and Analysis of Ores, Minerals and Waters.

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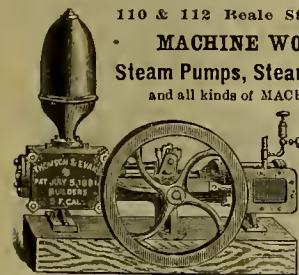
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Glohe Cases, free of cost, by applying to the manufacturers.

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PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

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Sole Licensed Manufacturers of the

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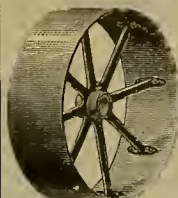
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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Are you going to make any change in machinery? Are you freighting by team or packing on mules? Do you want Pulleys on Shafting already up? If so, don't fail to look into the merits of

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WOOD SEPARABLE OR SPLIT PULLEYS.

They are the Lightest, Strongest, Best Balanced and Most Convenient Pulleys Made in the World.

Entirely new and original. Adapted to any power required. Time, trouble and money saved by using these pulleys.

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Revolving, Jetting, Hydraulic, Diamond, Prospecting Well Tools, Wind Engines and Deep Well Pumps. Treatise on Natural Gas, or our Encyclopedia, mailed for 25c. The American Well Works, Aurora, Ill.

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CHEMICAL LABORATORY,

BULLION ROOMS and ORE FLOORS,

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

Mining Share Market.

Mining stocks have been inactive, the only topic of interest being the contest at the Savage election on Thursday afternoon. This takes place too near the hour of going to press for us to report the result. Up on the Comstock changes are being made at the California battery and pan mill in the manner of transmitting power from the Pelton wheels in the Com. C. shaft. The surface wheel, which was at the mouth of the shaft, has been taken down, and is being set up at the battery-mill. The water-pipe which supplies it with propelling power will now come from the side of the mountain and course around direct to the battery-mill. After the water passes the wheel it will pass to a winze and be caught in a tank. It will then be taken by a large pipe, led down the winze 660 feet through the Latsrobs to the shaft, and then go to the 500-level as formerly, and then to the 1000 and 500 levels. The changes in the shaft are insignificant, being only that the power from each wheel will be aggregated on the surface-shaft independently of one another.

Placing a Pelton wheel at the mill, lands 95 per cent of its power on the tools and does away with wire ropes. It will also enable the mill to run when cleaning-up is going on at the pan-mill—a big advantage.

On the surface, transmission of power will be exactly as formerly, but its distribution at the mill will be quite different.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, July 19, 1888.

ANTIMONY—French Star.....	9 @ 9 1/2
BORAX—Refined.....	7 @ 7 1/2
Powdered.....	7 @ 7 1/2
Concentrated.....	6 1/2 @ 6 1/2
COPPER—	
Bolt.....	26 @ 26
Sheeting.....	26 @ 26
Ingots.....	26 @ 26
Fire Box Sheets.....	26 @ 26
IRON—Clemens & Co.....	22 1/2 @ 22 1/2
Eglington, 600.....	22 1/2 @ 22 1/2
American Safe, No. 1, 400.....	22 1/2 @ 22 1/2
Oregon Pig, 100.....	21 @ 21
Clay Lane White.....	23 @ 23
Shotts, No. 1.....	22 1/2 @ 22 1/2
Bar Iron (base price) @ 10.....	22 1/2 @ 22 1/2
LEAD—Pig.....	20 @ 20
Sheet.....	20 @ 20
Cast.....	20 @ 20
PIPE.....	7 @ 7
Black, discount 10% on 500 bag Drop, @ bag.....	15 @ 15
Buck, @ bag.....	15 @ 15
Chilled, do.....	15 @ 15
STEEL—English, 10.....	16 @ 16
Black Diamond tool.....	10 @ 10
Pick and Hammer.....	8 @ 8
Machinery.....	4 @ 4
Toe Calk.....	4 @ 4
TINPLATE—Coke.....	5 7/8 @ 5 7/8
Charcoal.....	5 7/8 @ 5 7/8
UTENSILS—By the piece.....	35 @ 35
Flasks, new.....	1 05 @ 1 05
Flasks, old.....	85 @ 85

New York Metal Market.

Telegraphic advices dated July 19th give the following New York prices:

BAR SILVER—91 1/2 per oz.

BORAX—9c.

COPPER—LARK—\$10.75

IRON—No. 1, \$22.00.

LEAD—\$3.92 @

TIN—\$18.50 @

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Easier, spot closing at \$16.50 @ 16.80. Transferable Notices (Lake) issued at \$16.50 @

LEAD—Firm, at \$4.02 @ 4.07 spot. Transferable Notices issued at \$3.97 @ 4.05

TIN—Dull at \$18.40 @ 18.50.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Billiton Tin, @—; Banca Tin, @—; Baltimore Copper, \$14.75 @ 15.00; Orford Copper, \$15.50 @ 17.75; P. S. C. Copper, @—; Foreign Lead, \$4.60 @ 4.65; Foreign Spelter, \$5.10 @ 5.15. Antimony, \$10.12 @ 10.30.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

G. W. INGRAMS—Arizona Territory.
A. F. JEWETT—Tulare Co.
C. E. WILLIAMS—Yuba and Sutter Co.'s.
JOHN L. DOYLE—Oregon, Montana and Idaho.
E. B. GREENWOOD—Humboldt Co.
W. W. THORNTON—Sonoma, Napa and Yolo Co.'s.
F. B. LOAN—Lake Co. and Nevada State.
S. J. LITTLEFIELD—Santa Barbara, Los Angeles and San Diego Co.'s.

Sampling Works for Sale.

The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Platform Scales, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises is an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPIE & CHILDS 123 California street, San Francisco.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

R. J. ELAM, a mining operator well known in Utah and Nevada, was drowned in Salt Lake on Wednesday, while bathing.

THE mining town of Calico, San Bernardino county, has again been visited by a serious fire.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M Co.....	Nevada, 49.	25.	June 5, July 10.	July 31.	L Oshorn.....309 Montgomery St
Bodie Tunnel M Co.....	California, 15.	25.	June 5, July 10.	July 31.	C C Harvey.....303 California St
Baltimore M Co.....	Nevada, 2.	25.	June 30, Aug 1.	Aug 22.	W W Tenney.....402 Montgomery St
Belcher M Co.....	Nevada, 31.	50.	July 18, Aug 22.	Sept 12.	J Crockett.....327 Pine St
California State Co.....	California, 10.	10.	Apr 18, May 24.	June 25.	J O Hanscomb.....10 California St
Diana C & S M Co.....	Nevada, 3.	10.	June 5, July 10.	July 31.	J W Pew.....310 Pine St
Eldred M Co.....	California, 2.	61.	May 28, June 18.	July 30.	N A Eldred.....15-3 California St
Foundry & Machine Co.....	Nevada, 3.	62.	July 12, Aug 17.	Sept 7.	J Stadfield Jr.....349 Montgomery St
Gould & Curry S M Co.....	Nevada, 59.	50.	June 22, July 26.	Aug 16.	A K Durlow.....309 Montgomery St
Gray Eagle M Co.....	California, 1.	65.	July 7, Aug 11.	Aug 31.	T Wetzel.....323 Montgomery St
Great Western C M Co.....	Cal form a. 1.	10.	July 17, Aug 24.	Sept 14.	A Halsey.....328 Montgomery St
Lone Jack M Co.....	California, 2.	10.	July 11, Aug 16.	Sept 7.	J J Scoville.....309 Montgomery St
Live Oak Drift C M Co.....	California, 9.	15.	June 13, July 17.	Aug 6.	J Morizo.....328 Montgomery St
Nye M Co.....	Nevada, 1.	65.	May 24, July 5.	July 24.	W J Dorlan.....40 Grass Valley
Occidental Con M Co.....	Nevada, 2.	20.	May 23, July 2.	July 23.	A K Durlow.....309 Montgomery St
Potosi M Co.....	Nevada, 20.	50.	July 13, Aug 16.	Sept 5.	C E Elliott.....309 Montgomery St
Russell Reduction & M Co.....	California, 2.	10.	June 6, July 9.	July 31.	J Morizo.....323 Montgomery St
Silver King M Co.....	Arizona, 1.	50.	June 23, July 30.	Aug 23.	J Nash.....328 Montgomery St
Summit M Co.....	California, 10.	10.	June 3, July 31.	Aug 25.	R Hancock.....29 Montgomery St
See Belcher & Mides Con M Co.....	Nev. 1.	25.	June 5, July 9.	July 30.	E B Holmes.....309 Montgomery St
Southern Cal Coal & Clay Co.....	Cal. 1.	10.00.	May 25, June 25.	July 25.	W C Mugau.....10 California St
Sierra Nevada M Co.....	Nevada, 92.	25.	July 10, Aug 14.	Sept 1.	E L Parker.....309 Montgomery St
Union M Co.....	California, 35.	25.	July 5, Aug 7.	Aug 25.	R Hancock.....29 Montgomery St
Venus M Co.....	California, 3.	35.	July 3, Aug 31.	Aug 20.	J Calver.....152 Fourth St
Western Mineral Co.....	California, 2.	1.00.	June 21, July 30.	Aug 20.	A Chamerant.....328 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Benton Con M Co.....	California, V R Allen.....	330 Pine St.....	Annual.....	July 27	
Lady Washington M Co.....	Nevada, W H Watson.....	312 Montgomery St.....	Annual.....	July 25	
Mountain Tunnel C M Co.....	California, E C Landes.....	216 Sansome St.....	Annual.....	July 26	
Mayflower M Co.....	California, L V Dorsey.....	Grass Valley.....	Annual.....	Aug 23	
Mayflower Cravel M Co.....	California, J Morizio.....	328 Montgomery St.....	Special.....	July 21	
North Belle Isle M Co.....	Nevada, J W Pew.....	310 Pine St.....	Annual.....	July 27	
New York Hill M Co.....	California, J B Leighton.....	313 Montgomery St.....	Annual.....	July 30	

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.....	Nevada, A V Havens.....	309 Montgomery St.....	July 12	50	July 12
Confidence S M Co.....	Nevada, A S Croth.....	306 Pine St.....	July 10	2.00	July 10
Eureka Con M Co.....	Nevada, H R P Hutton.....	306 Pine St.....	July 9	25	July 9
North Belle Isle M Co.....	Nevada, J W Pew.....	310 Pine St.....	May 7	50	May 7
North Star M Co.....	California, D A Jennings.....	401 California St.....	July 11	50	July 11
Hale & Norcross S M Co.....	Nevada, J P Hightower.....	309 Montgomery St.....	July 9	50	July 9
Isabel M Co.....	California, J P Hightower.....	Grass Valley.....	July 11	50	July 11
Pacific Borax, Salt & Soda Co.....	California, A H Clough.....	230 Montgomery St.....	July 10	1.00	July 10
Standard Con M Co.....	California, J W Pew.....	310 Pine St.....	June 12	15	June 12

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 28.	WEEK ENDING July 5.	WEEK ENDING July 12.	WEEK ENDING July 19.
Alpha.....	1.55	1.75	1.55	2.10
Alta.....	1.50	1.65	1.70	1.55
Andes.....	1.25	1.35	1.00	1.25
Argenta.....	1.15	1.10	1.15	1.15
Belcher.....	4.15	4.50	4.40	4.50
Brophy.....	3.65	4.05	3.95	4.50
Best & Belcher.....	3.65	4.05	3.95	4.50
Bullion.....	1.25	1.30	1.15	1.25
Baltimore.....	.75	.80	.75	.75
Bodie.....	2.25	2.40	2.25	2.40
Benton.....	1.00	1.00	1.00	1.00
Bodie Tunnel.....	.80	.80	.85	.85
Bulwer.....	1.00	1.00	1.00	1.00
Con. Va & M Co.....	1.00	1.00	1.00	1.00
Challenge.....	4.00	4.60	4.40	5.25
Champion.....	3.75	4.05	3.65	3.95
Obollar.....	3.75	4.05	3.65	3.95
Confidence.....	.17	.20	.19	.21
Con. Imperial.....	.55	.55	.55	.55
Caledonia.....	.35	.40	.35	.45
Con. Pacific.....	4.30	4.60	4.20	4.95
Crowd Point.....	1.00	1.25	1.00	1.00
Crocker.....	1.00	1.25	1.00	1.00
Central.....	.40	.45	.45	.55
Dudley.....	.40	.45	.45	.55
East B. & B.....	.40	.45	.45	.55
Eureka Con.....	1.10	1.20	1.10	1.20
Exchequer.....	1.35	2.30	2.25	2.50
Grand Prize.....	3.35	3.60	3.05	3.20
Gould & Curry.....	7.50	7.75	7.25	7.50
Hale & Norcross.....	1.00	1.05	1.00	1.10
Holmes.....	.75	.80	.75	.75
Iowa.....	.40	.45	.45	.55
Julia.....	1.00	1.05	1.00	1.10
Justice.....	.20	.20	.20	.20
Kentuck.....	.40	.45	.45	.55
Lady Wash.....	.40	.45	.45	.55
Mountain Tunnel.....	1.40	1.45	1.40	1.45
Mono.....	3.75	4.10	3.60	3.95
Mexican.....	3.45	3.80	3.60	3.95
N. B. & M.....	1.80	2.00	1.80	2.15
Nevada.....	3.20	3.40	3.20	3.50
North Belle Isle.....	3.55	4.10	4.00	4.50
North G. & C.....	1.10	1.20	1.10	1.20
Occidental.....	7.00	7.50	7.25	7.60
Ophir.....	1.70	1.95	1.75	1.95
Overman.....	1.35	1.50	1.35	1.50
Potosi.....	2.10	2.25	2.10	2.25
Pearless.....	.70	.75	.75	.75
Per.....	.70	.75	.75	.75
P. Sheridan.....	.70	.75	.75	.75
Silver Star.....	.70	.75	.75	.75
Savage.....	2.75	2.95	2.75	3.00
S. B. & M.....	3.60	4.00	3.45	3.75
Sierra Nevada.....	.60	.65	.65	.65
Silver Hill.....	.65	.75	.75	.75
Silver King.....	.65	.75	.75	.75
Scorpion.....	.65	.75	.75	.75
Syndicate.....	.65	.75	.75	.75
Union Con.....	1.40	1.55	1.40	1.55
Utah.....	5.00	5.00	5.00	5.00
Yellow Jacket.....	1.10	1.10	1.10	1.10

Sales at San Francisco Stock Exchange.

THURSDAY, July 19, 1888.	50	Could & Curry.....	2.80
100 Alpha.....	1.80	100 Hale & Nor.....	.55
100 Alta.....	1.55	450 Justice.....	1.05
100 Andes.....	1.15	50 Kentuck.....	1.75
350 Baltimore.....	.40	500 Locom.....	.10
150 Belcher.....	.85	300 Mexican.....	.35
100 B. & Belcher.....	.60	50 N. Belle Is.....	.30
270 Bullion.....	1.20	100 Nev. Que.....	.0
300 Bodie.....	.20	250 Overman.....	.85
200 Buwer.....	.80	100 Ophir.....	.60
200 Chollar.....	.25	200 Occidental Con.....	1.50
150 Con Va & Oal.....	.50	175 Savage.....	3.80
100 Crown Point.....	.50	250 S. B. & M.....	3.50
700 Con. Imperial.....	.50	100 Sierra Nevada.....	10.10
40 Confidence.....	.17	100 Utah.....	1.45
100 Crocker.....	.95	40 Union.....	3.30
100 Exchequer.....	1.10	150 Yellow Jacket.....	4.45

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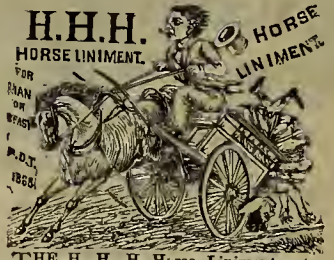
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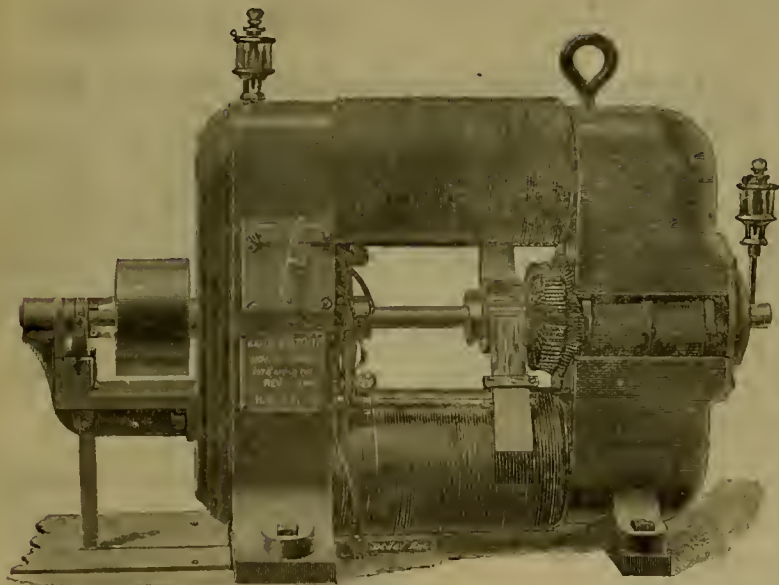
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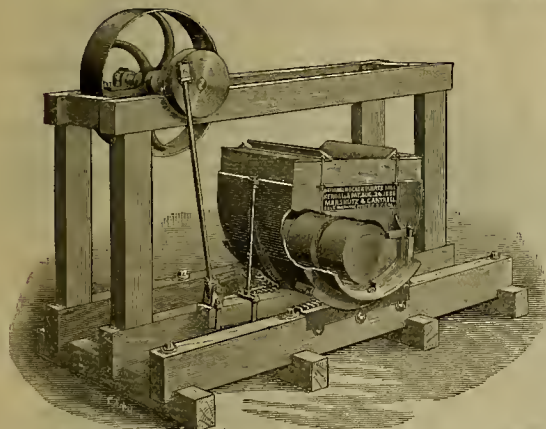
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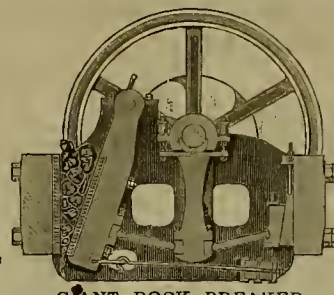
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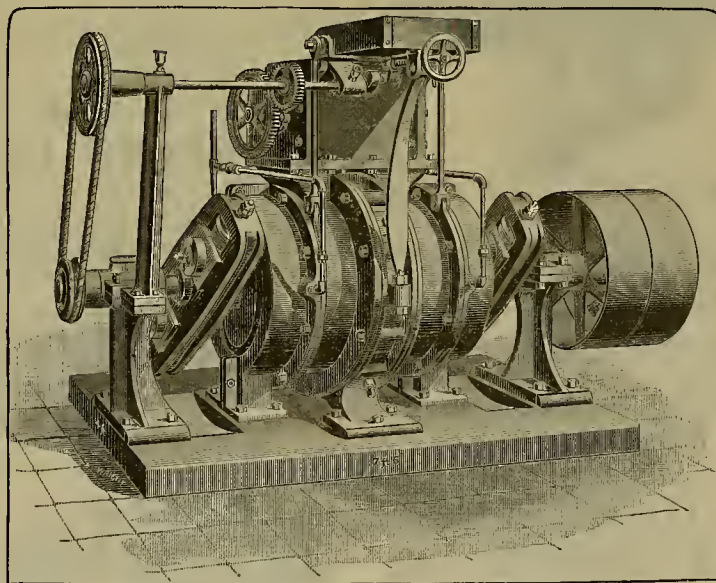
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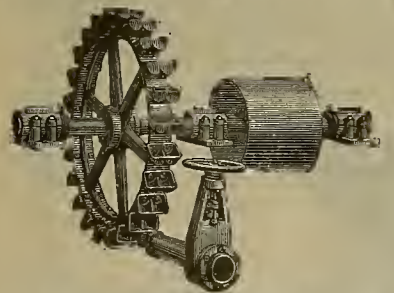
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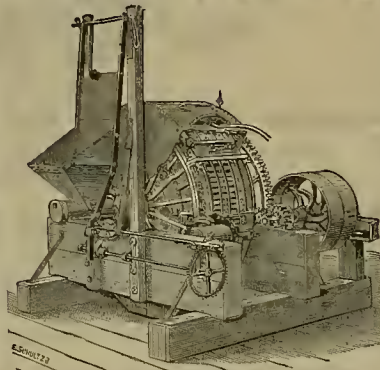
—MANUFACTURERS OF—

MARINE ENGINES AND BOILERS.—Propeller Engines, either High Pressure or Compound, Stern or Side-wheel Engines.

MINING MACHINERY.—Hoisting Engines and Works, Cages, Ore Buckets, Ore Cars, Pumping Engines and Pumps, Water Buckets, Pump Columns, Air Compressors, Air Receivers, Air Pipes.

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**Tustin's Pulverizer
WORKS ORE WET OR DRY.**

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Water Pipe, Pump or Air Columns, Fish Tanks for Salmon Canneries

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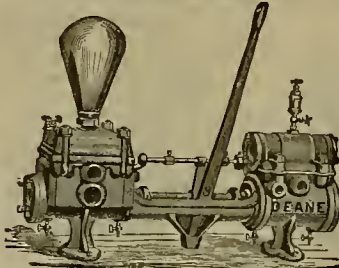
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Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,
Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safer in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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Manufacture Iron Castings and Machinery of all kinds at Greatly Reduced Rates.

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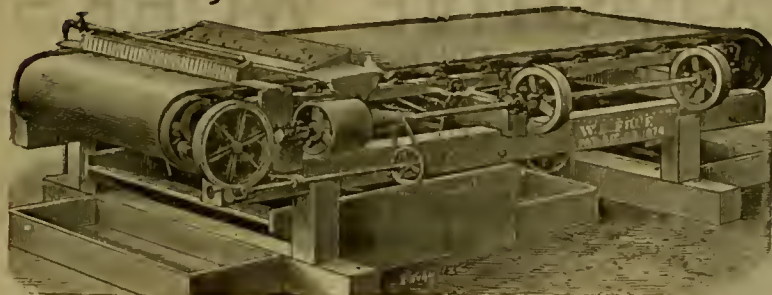
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Assaying of Ores, \$25; Bullion and Chlorination Assay, \$25; Blowpipe Assay, \$10 Full course of assaying, \$50. Send for circular.

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OR VANNING MACHINE.**

**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
(\$575.00) F. O. B.**

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

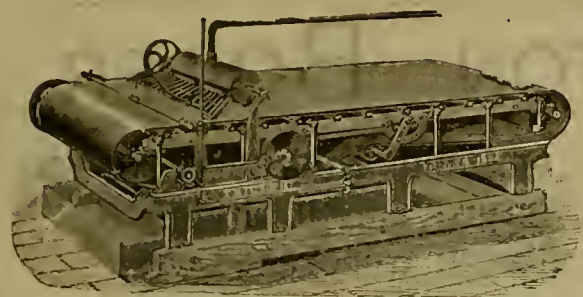
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1870; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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\$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



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The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

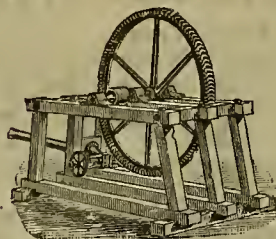
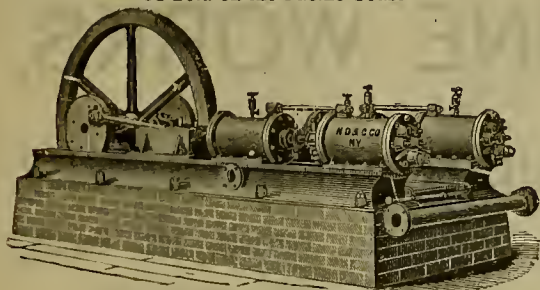
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COMPRESSED AIR and WATER POWER MACHINERY.

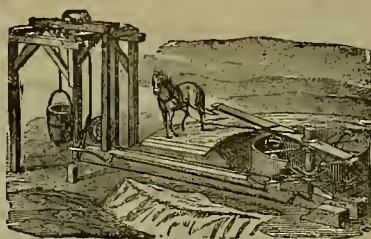
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NATIONAL AIR COMPRESSORS.

SINGLE OR DUPLEX, STEAM OR BELT POWER.
62 Sold on the Pacific Coast.



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—FOR—
MILLS, PUMPING AND HOISTING.**
Over 300 in use. All estimates guaranteed. Send for Circular.



MINERS' HORSE WHIM.

All wrought iron. No gears, no breakage. One horse will easily handle rock or water to a depth of 50 feet, giving entire satisfaction to the prospector. Price, complete, \$200. 150 sold on this Coast.



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200 Sold on this Coast. Has less repairs than any other Drill.

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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER.
FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

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NOTICE.—All our plates are guaranteed to have the full weight of silver agreed upon, and are tested before leaving our works, thereby avoiding the complaints about light weight, made so often before we started in this branch of industry.

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ATTENTION, GOLD MINERS!

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Silver-Plated Amalgamating Plates For Saving Gold in QUARTZ, GRAVEL and PLACER MINING,

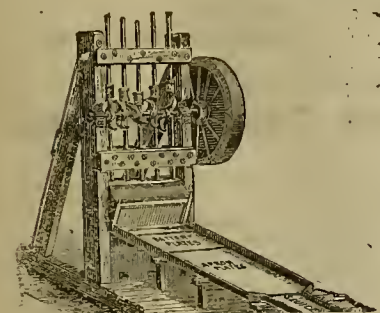
At reduced rates. Get our prices. Three thousand orders filled. Fifteen medals awarded. Our plates have proved the best, and far superior to others in weight of silver and durability. Old mining plates replated. These plates can also be purchased of JOHN TAYLOR & CO., cor. First and Mission Sts.

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NOTICE.—Our Silver Plated Plates have always proved as represented. We have been manufacturing them for 20 years, and use only the best Lake Superior Copper and Refined Silver. Comparing our plates with those of other manufacturers, after repeated tests, we can safely guarantee much better plates for the same money. Our plates are used by all the prominent mining men on the Pacific Coast. SEND FOR CIRCULAR.



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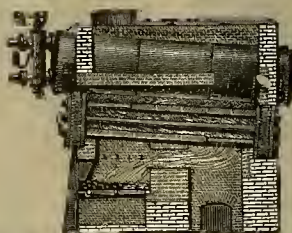
L. R. MEAD, Secretary.

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Manufacturers and Sole Agents for the Pacific Coast for

HEINE SAFETY WATER TUBE BOILER.



Has the Following Advantages:

**SAFETY,
DURABILITY,
ECONOMY,**
AND FACILITY OF INSPECTION and REPAIRS.
60,000 Horse Power now in use.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works Hueter Bros. & Co., California Jute Mills, and other places.

Guaranteed More Efficient than any other Boiler made.

BUILDERS OF

QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.
AIR COMPRESSORS—Rope Power Transmission.
HYDRAULIC PUMPING and Hoisting Machinery.
WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.
SAW-MILL MACHINERY of all kinds.
STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.
SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 50,000 horse power now in use.
MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

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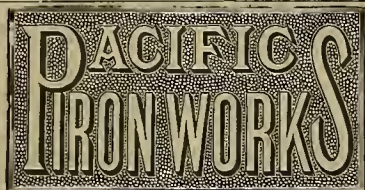
STEAM BOILERS of all descriptions.

SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ore and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE HAZELTON BOILER

Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

IT IS UNEQUALED FOR SAFETY, ECONOMY AND DURABILITY.

A Saving in Fuel of at Least 20 per cent Guaranteed over any other form of Boiler.

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Sole Manufacturers for the Pacific Coast,

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JOSHUA HENDY MACHINE WORKS,

(INCORPORATED SEPTEMBER 29, 1882.)

Nos. 39 to 51 Fremont Street,

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MANUFACTURERS OF

NEW and Dealers in SECOND-HAND BOILERS, ENGINES and MACHINERY OF EVERY VARIETY.

Steam Pumps of all Makes,

CENTRIFUGAL PUMPS,

MINING PUMPS.

BLOWERS AND EXHAUST FANS.

LEATHER and RUBBER

BELTING.

LUBRICATING COMPOUNDS and OILS

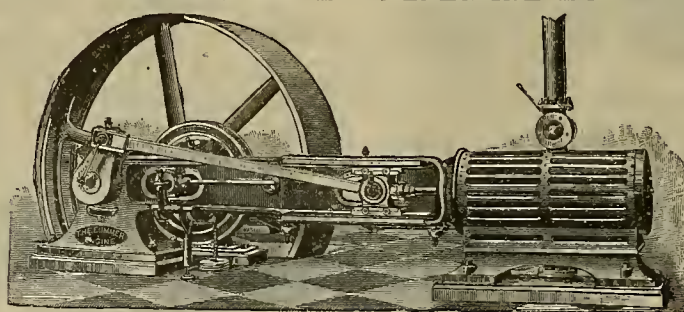
OF THE BEST MAKES.

PIPE and PIPE FITTINGS.

Brass Goods

AND
FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



SPECIAL AUTOMATIC ENGINES.

(Manufactured by the Cummer Engine Co., of Cleveland, Ohio.)

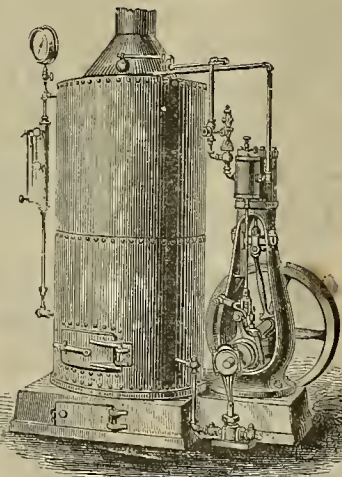
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ENGINES and BOILERS.

Shafting,

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Boxes,

Hangers.



Upright Engines and Boilers Connected.

WOODWORKING MACHINERY,

— COMPRISING —

BAND SAWS, STICKERS,
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IMPROVED

Single and Double Circular Saw-Mills.

AGENTS FOR THE SALE OF

"Cummer" Engines, from Cleveland, Ohio,
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Boggs & Clarke's Centrifugal Pumps.
The Volker & Felthousen Mfg Co.'s
Buffalo Duplex Steam Pumps.
P. Blaledell & Co.'s Machinists' Tools.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, JULY 28, 1888.

VOLUME LVI.
Number 4.

Cable Railroads.

In this city, where cable roads originated and where we have had the greatest experience with cables, there are no electric roads, though several experiments have been made. We are building more cable roads than ever in San Francisco. The Market-street system is running 21 hours a day, with cars 40 seconds apart, doing its work cheaply and regularly, with no

property. The convenience of frequent and rapid transit attracts people to those localities where there are cable roads. It is a proof that they are good properties when so much new road is being built in the city where cables have been known the longest.

THE ECLIPSE.—The total eclipse of the moon which occurred on Sunday night was not observed in this city or Oakland, owing to the pre-

The Cogswell Polytechnic College.

The first session of the Cogswell Polytechnic College will open for the reception of students Monday, August 6, 1888.

The object of this institution is not to teach trades, but to prepare students to enter successfully upon any line of useful work. The aim is to fully develop the boy and girl mentally, morally and physically, thereby producing

porch. On each side of the door is a niche for the placing of pieces of statuary. There are also two side entrances—one for boys and the other for girls. The main entrance porch is approached by a broad flight of stone steps. The main hallway is 10 feet wide, and opens into a cross-hallway 12 feet wide, which crosses the building from end to end. From the cross-hall, stairways lead to the second story; stairs also lead to the stage at the rear and to the



COGSWELL POLYTECHNIC COLLEGE, SAN FRANCISCO.

serious stops or breaks. The Olay street, Sutter street, Presidio, California street, McAllister street, Geary street, Powell street, Haight street, Hayes street, Castro street, Larkin street, and all the main and branch lines work successfully day and night, winter and summer. A four-mile double track is being put down on Howard street, and two miles on Fell and Oak streets to the park. On Clay and Sacramento streets 11,000 feet of track is being put down as a branch to the Powell-street road. It will not be long before another cross-town road will be built on Third, Montgomery and connecting streets. The city will soon be a network of cable roads.

While the first cost of these cable roads is large as compared with horse-car or motor lines, they are so built as to need little repair, and immense traffic can be maintained. The cable roads pay well, and, wherever built, have resulted in enhancing the value of contiguous

vailing fog. At Mount Hamilton, however, they had an excellent night for observing. Prof. Holden and Messrs. Schaeberle, Keeler, Barnard and Hill were all engaged in the observation, and the work will shortly be reduced and discussed. Forty-seven drawings were made at the telescope, and 11 with the naked eye.

ANTHONY CLARK, the veteran miner of Forest Hill, says the Dardanellas mine, with a ten-stamp mill, is good for \$20,000 a month. At present there are only five stamps, and they are not run right along on account of scarcity of water. Last week the cleanup amounted to \$2600, although the mill was not run all the week. This would be an average of more than \$10 to the carload.

JOHN HAYS HAMMOND, M. E., has gone to inspect a mine about 100 miles south of the City of Mexico.

self-reliant and self-helpful men and women. The school and building are the result of a donation of \$1,000,000 by Dr. Henry D. Cogswell, and the college is located at the corner of 26th and Folsom streets in this city.

The building is three stories high, and from its imposing and substantial appearance is the most notable structure in the southwestern portion of the city. It is 71 feet in width by 85 feet in depth, not including the projections. On each side there is a wing two stories in height, each 35x40 feet. The building is surmounted with a high roof, covered with ornamental metal Queen Anne shingles, and has a handsome cresting on the ridges. In front a high tower rises to a height of 127 feet, the apex topped with a revolving crystal star set in a copper pinnacle. On the face of the tower, above the third-story line, is the dial of a clock, and still lower down the name of the school. The main entrance is spacious and surrounded by a wide

front of the assembly hall, in the story above. It will thus be seen that the means of egress are unusually excellent, there being three wide doorways from the ground floor to the street and two from the second story to the assembly hall.

HEALTH OFFICER BARGER states that the quarantine station at this port, for which \$103,000 has just been appropriated, will be located on Angel island, and constructed under the supervision of the Marine Hospital service. The appropriation will probably be disbursed in part as follows: Disinfecting machinery, \$20,000; warehouse and wharf, \$1000; steam tug, \$30,000; small boats, \$1000; hospital buildings, \$24,000, and annual expenses, \$18,000.

In many of the mines of Butte, M. T., the system of payment has been changed from pay by the day to the contract system of payment per car of producing ore.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

A Miner's View of Geology.

EDITORS PRESS:—Mythology is responsible for a great many foolish ideas taught in our high schools about geology and astronomy. Very different is a miner's view of geology, as demonstrated by chemical and microscopical analysis, and practically applied in the field by topographical and underground explorations. When our standard works on geology teach the igneous formation theory, and that the world inside is a molten mass of liquid heat, it is misleading. When they teach that the aqueous formation is subsequent to the igneous, it is misleading, etc. In tracing back to find what the human family were about the beginning of the world, I soon found myself in Hindostan. They had a mythology with a Board of Gods, all having some creative ability. Buddha, about 600 years B. C., gave a good code of moral laws, and his gods made the world and were not very particular what they made it of. The next place I found myself was in China. I found things developing there from way back, but coming on up to Confucius' time. They had a mythology with a code of moral laws very good, and their god had some business system, for each god had his constructive department allotted to him. They jointly made the world, but did not classify the material used in the construction. Now I passed over into Egypt and found Moses and his mythology. He had a wide-awake God that headed anything prior to his time. This God made everything—the world and our solar system—Himself, with no help; but He did not tell Moses what He made all these things of, so I found it was left for the human family to find out the material used in the construction of the earth.

I find they commenced by noticing the debris, coming down from higher elevations, and forming what we call soil. This they settled upon as a water formation—aqueous. Next they noticed red-hot lava coming out of volcanic craters. This led them to believe that the inside of the earth was a molten liquid mass of lava, and from this molten mass rocks were formed. These are classed as igneous rocks. This idea is taught in all our high schools throughout the civilized portion of the world up to date, coupled with Moses' mythology and his God. Great effort has been made to make geology agree with Moses' mythology.

Later on another element came in—astronomy. Science has developed that there is unity between geology and astronomy, and they both declare war against Moses' mythology and that of all other nations.

There is no question in my mind about this fight. All mythology has got to surrender and be wiped out from the human mind.

Now we come to a period of record where theories and facts are compiled and preserved for future analysis, coming up to our present age. We have chemicals and appliances that enable us to analyze and microscopically examine any substance. The result of this work shows us that every known substance is a compound, and the primitive parts are in a gaseous, liquid or aqueous solution. One part has an affinity for a second; the first and second united make an affinity for a third part, and so on, forming all substances by affinities. The granites and trap families are classed by the old standard as igneous rocks. Analysis shows us just what the compounds are. The two principal compounds are silicates of magnesia and silicates of alumina. Other compounds are silicates of potash, soda, lime, iron and manganese, that make up the compounds of all classes of rocks. By acid all these properties are held in solution in boiling water (a heat as low as 212 degrees). When our science has advanced to this perfection, we can demonstrate these facts to a certainty.

Can any man who has followed mining for a business practically say that granite is not formed from aqueous solutions? We have classed rocks down to four grand divisions, thus: Igneous, aqueous, aerial and metamorphic. These terms are all right except when misapplied. Igneous should apply to lava—anything produced from a molten mass. Aqueous applies to mechanically, chemically and originally formed soil or rock. Aerial applies to debris and dust deposits from currents of air. Metamorphic applies to argillaceous, calcareous and cretaceous formations. This fourth division includes all rocks mechanically, chemically and originally formed from aqueous and acid solutions. This division takes in all quartz, feldspar, basalt, trap and the granite family, that the old standard claims to be igneous rocks. For the igneous theorist I will state that we claim no heat higher than boiling water and acid in solutions for aqueous formations of all rocks; and that there are no igneous rocks or formations except those formed from the melting of the original aqueous rocks or clay; and there is no heat coming from the earth but that coming from chemical decomposition of the deep aqueous formations that were once at the surface. Now, when we go among the human family to find the origin of aqueous rocks, we find no authority higher than Moses' mythology and his God. When we go into chemical analysis, we find there is no compound of mineral or vegetable matter, but their elements are found in our atmosphere.

I ask all mining men to apply this aqueous-

solution theory to all their explorations, and study the affinity of minerals and the primitive compounds that form them. Geology has just commenced assuming its independence of mythology, and the same of its sister science, astronomy. The two sciences combined will soon be able to shame mythology, until it will have no existence in the human mind. What the new era that is coming in will require, will be demonstrated facts, and will be satisfied with nothing short of that.

MINER.

Como, Nevada.

EDITORS PRESS:—As we said in our last, "If we continue to increase and prosper, you should hear from us again," and since those conditions prevail, we must make our promise good.

Our population is now about 35. We were patriotic enough to remember the Fourth, and spent about \$30 in celebrating. Our fireworks were seen in Virginia City, a distance of 20 miles.

Our weather is delightfully cool and pleasant to-day, July 11th—62°. Highest temperature for the season thus far, 92°, and that only one day.

This is an old camp, and was first prospected and worked about 1861. The palmiest days were from '61 to '65, when the town of Como contained about 500 inhabitants. Thousands of dollars have been squandered here in prospecting, running tunnels, sinking shafts, etc., but always stopping before going far enough to develop anything. The deepest shaft is not over 250 feet, but considerable ore has been taken out from near the surface in different places, and all mining experts who have ever visited the district are agreed that the surface indications point to the fact that a bonanza must exist here somewhere, and they all think it will be found when sufficient depth has been attained. Very rich free milling ore has been recently discovered in the Buckeye at about 100 feet, but in what quantity has not yet been determined.

The only mine in the district upon which active operations are being carried on at present is the Eureka Como, but there is talk of commencing operations on two or three others in the camp, soon.

The Eureka Co. are going ahead with their development work as fast as possible and will soon have their shaft down to the 300-foot level, from which they may run a drift to tap a 10-foot ledge which is known to exist, and from which quantities of good paying ore have been taken above the 200 level. They have machinery sufficient to sink to a depth of 600 feet. This mine may be the means of developing the whole district.

A heavy growth of nut pine once covered this country, but during the last 25 years it has all been cut and hauled away, until to-day not even the stumps remain to tell where a forest once stood. It is said that Uncle Sam has been robbed of at least \$3,000,000 worth of wood in this district alone. There is now a sparse growth of young pines springing up all over the hills which might amount to something within the next century if let alone. The scarcity of wood will be the most serious drawback to extensive mining operations in this district, provided rich strikes are made here. CHROMO.

Como, Nevada, July 20th.

El Dorado County Mines.

EDITORS PRESS:—The Davidson mine, at Shingle Springs, is still idle, although a most excellent property. This is owing to a want of funds to work it since the mill was burnt down.

The mills of the following mines are all shot down at present, viz.: The Con. California, El Dorado, Crystal, Oro Fino, Volante and Crane, all in the vicinity of Shingle Springs; also the Mt. Pleasant, Morey and Melton, near Grizzly Flat.

The Josephine mine, Volcanoville, above Georgetown, is now erecting a new 20-stamp mill, most of the machinery having reached Georgetown. The whole is under the superintendence of Jos. M. Nonges, a San Francisco attorney.

The Zentgraf mine, at Wild Goose Flat, is being worked and the ore being milled by the Zentgraf Bros. is yielding very satisfactorily.

The Grand Victory mine, three miles above Diamond Springs, on the old emigrant road, at Squaw Hollow, is one of extreme proportions, having been worked some 250 feet in width and about 200 feet in depth. It is a quarry of porphyry, containing gold. All the ore taken out has been put through the 50-stamp mill. The material was very low grade, yet always paid with a profit, as it required but a few men to do the whole. The mill is now closed down.

The Gopher Boulder mine, near Kelsey's, is now owned by Geo. Cullen Pearson of London, England, who is now on his way here to commence active operations. The foreman in charge has a force of men at work preparing. The company is about to introduce electricity as a motive-power by transmission from their dynamo driven by water-power. By this method not only all their machinery will be driven for hoisting and milling, but it is also their intention to supply Placerville and Georgetown with electric lights from the same source. This mine is directly on the "mother lode," and is an immense ledge, carrying at times

quite a percentage of sulphurets of good quality. This undertaking will require not only a force of men, but also a large expenditure of capital.

The Taylor mine, near Georgetown, in Garden valley, is running ten stamps. This mine is paying handsomely and giving entire satisfaction in its results. It is in charge of Mr. Chesley as superintendent.

The Alpine mine and mill is located about three miles from Georgetown. It is owned by the Walker Bros. of Salt Lake, and is under the management of J. H. Morton, supt. The mill is a new one of 10 stamps, but unfortunately is not built as solidly as it should be, and certain defects now existing should be remedied. The mine in my opinion is a good one, and will pay if the ore is properly milled.

The owner of the Esperanza mine is a working man who has spent some years past on the property preparing to tie it to the end, knowing he has one of the best in the county. Although of low grade, the ore body is of a width of 52 feet in the bottom of shaft. Preparations are now in progress by which work will be resumed in sinking immediately, as the present hoisting works will do to go down to a depth of 500 feet.

The Church Union mine after having been worked for the past 25 years to a depth of 1700 feet, has finally been shut down by the owners, Messrs. Hayward and Hohart. Not because it would not pay, as the last winze sunk below that level shows better ore than ever. Nevertheless the mine has been stripped of the hoisting works, engine, boilers, mill-stamps and all the appurtenances, a part of which is being transported to Angels camp, and the balance to the Dead Horse mine in Tuolumne county, both of which are new purchases by the above gentlemen. Various are the surmises as to whether this mine is to be closed for good or whether on account of insufficiency of machinery to operate to a greater depth in the future. Anyway, it is to be regretted, as it creates a stagnation in this part of the county which will be severely felt. K.

Two Shafts in Mines.

EDITORS PRESS:—In your paper of date 7th inst., I found a short and sensible article headed "Two Shafts." The item is, however, erroneous to this extent: it was written under the idea that we had no law in this State upon that subject, but we have, as you will find in Stats. 1871-72, p. 413. It is true its provisions are applicable only where shafts have been sunk to the depth of 300 feet, and 12 or more men are employed daily.

It was the best we could do at the time, for mine owners fought the proposition all the time, and defeated the bill at the previous session, notably the opposition coming from the leading miners in Nevada and Amador counties.

I drew the first bill (session of 1869-70) for Sam T. Oates, then assemblyman from this county, who, being an operative miner, desired the honor and credit of the law. It was a hobby of his. John K. Sales engineered the thing in our county at home by getting up a numerous signed petition. The original idea had been previously advanced by myself, and the groundwork laid by talking about it among our people during years before.

Oates got our bill pushed through the Assembly by hard work, and because it was about the only bill he had introduced. I took charge of it in the Senate, procured a favorable report from the Committee on Mines, being on the committee, made a "big speech" in its favor, and had it killed by the lobby—the corporations and mine-owners—quicker than a wink. Sam Oates sat beside my chair while I spoke and while the vote was being taken, and was hugely disgraced, notwithstanding I had advised him beforehand that the opponents of the bill had slowed it to pass through the House only as "a tub to the whale," and that they had a dead thing all out and dried on heating it in the Senate—as they did, and I knew it—I had the list of yeas and nays made out lying on my desk, almost as the roll-call resulted.

At the next session, Hon. J. M. Days, now of San Francisco, being then assemblyman from Nevada county, introduced the present law, and as we had made it pretty hot for the opponents of the measure before the people in the election that year, we were able to carry it through. The law is good as far as it goes. It should read 200 feet and employing six men; perhaps that is the only improvement we could make. Suppose you publish the whole law. Very truly yours, E. W. ROBERTS.

Grass Valley, Nevada Co.

CANDLES.—An item of interest to the mining community is that a pool or trust has been formed East between the 16 or 18 candle factories, and for some time the trust has been trying to induce the three candle factories here to come into the ring. Two of the companies desire to go in, but are unwilling to do so without the third. Candles have advanced recently two cents per pound in the East, and this advance would be made here if the home manufacturers would come in.

The Northern coast coal mines are doing good work and are steadily increasing their shipments. So far they have found ready sale for their entire output without making concessions in price.

A New Mining Enterprise.

EDITORS PRESS:—Believing that most of your readers are more or less interested in whatever pertains to the welfare of the mining industry of our coast at large, I submit a few facts concerning a new incorporation denominated the Galena Consolidated Mining Co. The properties embraced in this consolidation are the well-known Shannon claims, situated in Washoe county, Nevada, about three miles by wagon-road west of Galena station on the V. & T. R. R.

In early mining days large quantities of ores were taken from these properties, then known as the Indian Boy mines. A large proportion of the ore was hauled by teams to California for reduction. The remainder was treated at a smelter located on Galena creek.

Owing to the fact that the treatment of lead ores then was a new industry in this part of Nevada and of course imperfectly understood, and furthermore the great expense of fuel and fluxes for proper smelting of the ores and high price of labor, the business of smelting was not a success and the mines were temporarily abandoned. Since then the only method of developing the claims has been performed principally by lease-holders, who instead of pursuing a systematic course have simply "surface robbed" the property. Under this system many carloads of good ore have been shipped to San Francisco, Salt Lake and Denver for reduction.

With reduced smelting charges, even with exorbitant freight rates, the leasees have all, with a single exception, met with gratifying success in their ventures. By reason of inadequate facilities the ores and waste were handled a half-dozen times, where, under systematic management, the needless expense of handling more than once might have been avoided.

The ores are chiefly a hard carboniste, although a large portion carry sufficient iron and lime to make them self fluxing ores, consequently may be reduced at a far less cost than where fluxes must be procured. One mine in this consolidation shows a ledge of hematite ore, and, although of a low grade as to gold and silver, is of great value to a smelting plant on account of its superior qualities as a flux. The value of the company's properties here may be best judged from the fact of their once having been worked at a profit when all mining expenses and shipping were much greater than at present.

The result from a millrun at the Melrose smelting works showed a total average value per ton of \$25.35, being silver \$19.35, gold \$6, and iron 85 per cent, with a small percentage of lead (less than 10). By adding a small quantity of lime in connection with the carbonate ores, it would enable a home smelter to handle any ores from this and adjoining properties. This will necessarily be accomplished in time. The returns from ores shipped to the various smelting works more recently averaged in silver 52½ ounces; gold, two-tenths ounce; lead, 32 per cent, making total value per ton over \$75.

By a cheap preparatory treatment of ore and by concentrating, as now proposed, before shipping, the bulk of ores will be greatly reduced and the value per ton shipped consequently increased. In view of the fact that smelting facilities are now within 16 miles of the mines, instead of hundreds as formerly, most of the ores heretofore considered valueless may now be shipped at a profit. This fact was demonstrated last April when a small lot of 4800 pounds was worked at the Reno reduction works, returning a total value of \$93.13, being silver \$35.95 and lead \$54.18—the proportion of lead being 38 per cent and all this taken for a trial wholly from the waste portions of the mine. Samples of ore from stopes, taken carefully for an average test by E. D. Boyle, Esq., assayed: Silver, \$138.91; gold, \$12.56; and lead, 68 per cent.

This is a fine carbonate ore and lies west of first workings, the ore now showing in upper stopes running lower in silver, no gold, but a little higher in lead, viz., silver, \$53.57; lead, 70 per cent. From present indications a large amount of these classes of ores may be taken out and shipped whenever thought advisable to do so. To be profitable, proper facilities both for mining and for hauling will of necessity have to be provided.

Several noted mining experts, having examined these properties, are unanimous in their opinions that the main ore body will be found westerly from old workings. This is determined by the main feeders pitching in that direction. In consequence, a shaft will be sunk at a point where, at a depth of 200 feet, it will intersect the vein. From this point the mine may then be properly and conveniently worked. At this stage great results are expected as the reward.

The company feels warranted in asking the public to take a hand with them in developing the property and thereby sharing the results. The capital stock is \$100,000, divided into 100,000 shares—\$1 each. It is proposed to sell one-half of the stock now at ten cents per share, the balance, if necessary, at whatever valuation future developments may seem to warrant. The board is composed of E. D. Boyle, Pres.; F. C. Lord, Sec.; E. G. Stevenson, F. E. Fielding and W. H. Armstrong, Trustees. Any further information will be cheerfully given by J. L. Stevenson, Supt., Reno, or by the secretary at Virginia City. Reno, July 16, 1888. F. B. L.

THE directors of the Mechanics' Institute are busy preparing for the coming fair.



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SAN FRANCISCO

Saturday Morning, July 28, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Cable Railroads; Cogswell Polytechnic College, 53. Passing Events; Timber Depredations; Aliens and Mineral Lands; To Investigate the Debris Problem; Lower California Mines, 58. Big Assays; The Late H. P. Gregory; The Launch of the Charleston; Condensing Chambers in Smelting Plants, 57.

ILLUSTRATIONS.—The Cogswell Polytechnic College, 53. Reveratory Furnace and Dust Chamber at Leadville, 57.

CORRESPONDENCE.—A Miner's View of Geology; Combs, Nevada; El Dorado County Mines; Two Shatts in Mines; A New Mining Enterprise, 54. The Castle Mountain Mines, 55.

MISCELLANEOUS.—The Russell Process, 55. **MECHANICAL PROGRESS.**—The Secret of Cast Steel; Rolling Out Chains of Wrought Iron; An Unsolved Mystery; Locomotive Building; Lead-Coated Sheet Metal Plates, 58.

SCIENTIFIC PROGRESS.—Face Reading is not a Science; The Direction of Sounds; The Phenomenon of Color; Drying Effect of Natural Oas; A Fragment of the Iliad; An Ancient Globe; The Horse; Virtue and Vice, 59.

GOOD HEALTH.—Emperor Frederick and General Grant; State Health Report; Fastings and Poisons, 59.

USEFUL INFORMATION.—Flowers in China; Artesian Wells in New York City; A Curious Instrument; Eagles Pursue and Destroy Deer; The Horses of Japan; How to Prepare and Color Calcimine; A New Fuel for the Prairies, 59.

ENGINEERING NOTES.—The Nova Scotia Ship Railway; De Lesseps and His Canal; The Eads Jetties; The Largest Drawbridge; Deterioration of Storage Batteries, 59.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 60-61.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 64.

Passing Events.

The closing down of the Germania smelter, Utah, is expected to be followed by the closing down of other establishments. This action is forced upon the smelting managements by the disastrous freight rates exacted by the railroads. The rats on bullion has been \$18 per ton, while the roads carry ore out for \$12 a ton. Ores that come from Nevada and Utah points going East have a certain rate to Salt Lake, which is much lower than on ores landed in Salt Lake for the home smelters. On the 23d inst., the rate on bullion from Salt Lake to the Missouri river was reduced from \$18 to \$15 per ton.

The failure of the new smelter at Colville, W. T., is bad for that region. Still it depended on the ores of one district, and there was insufficient capital to conduct the business.

Information printed in another column concerning the Lower California mines bears out the prediction made in the PRESS at the time the excitement began. That region has so little water available that it is hard to make any gold-mining operations successful.

The mines of this State generally were never in a more prosperous condition, and the quartz industry is making rapid progress.

The recommendation of the committee favorable to the Biggs bill, on the debris question, will please the mining community of California.

The water of the north fork of the Feather river, says the Biggs Argus, has been turned into the Big Bend tunnel, and very soon a large body of men will be working on the river bottom left dry by the tunnel.

Timber Depredations.

The Commissioner of the General Land Office has, it is said, received a telegram from the special timber agent on duty at Eureka, Nevada, to the effect that the depredations committed on the public lands by two corporations have amounted in that district to \$10,000,000; the two corporations alluded to being, presumably, mining companies.

How these two companies or any number of mining companies could have caused such extensive timber spoliation in that part of Nevada is matter for surprise, seeing there never was grown a single tree within 300 miles of the Eureka district available for making good lumber. The woodlands in that section, as well as throughout the entire State, save a narrow belt along the eastern slope of the Sierra, consist almost wholly of nut pine, mountain mahogany and juniper, all acrobby trees, and having a much scattered growth. There occur in a few places small patches of white pine, a somewhat larger tree, though it seldom reaches a height of more than 40 or 50 feet, and a diameter of two feet. The wood is soft, and when converted into lumber, warps badly. If two saw-logs are cut from this tree the upper one will be full of knots, rendering it almost worthless for lumber. As for the other trees mentioned, while they make good fuel, not even the most inferior kind of lumber can be manufactured from them. If they are sometimes employed for building cabins and corrals, palisade fashion, this is the only use ever made of them except for fuel.

The congressional law regulating timber-cutting on the public domain, enacted June 3, 1878, authorizes citizens of the United States to fell and remove for building, agricultural, mining or other domestic purpose any trees or timber growing on public mineral lands, under such rules and regulations as the Secretary of the Interior may prescribe. Any one guilty of violating the provisions of this Act or of the rules and regulations made in pursuance thereof, is liable to a fine of \$500 and to imprisonment for six months. Cutting timber on the mineral lands for sale or willfully destroying the same are also unlawful acts.

Although not so stated, the depredations complained of must, of course, have been committed in violation of some one or more of the above provisions; but, all the same, it puzzles us to see how any such amount of damage as is here alleged could have been done by these mining companies. Ten million dollars is a large sum, more, we opine, than all the trees ever grown in Central Nevada would sell for were they cut and corded up or converted into lumber.

A little figuring will disclose what an amount of improbability is involved in this statement. As above remarked, the tree growth throughout all that portion of Nevada is not only stunted but exceedingly sparse. Over large areas it will not yield more than two or three cords of wood to the acre, the average yield of the whole not exceeding five cords per acre. As this wood, before being cut, is worth not over \$1 per cord, the corporations complained of, to cause a damage of \$10,000,000, must have denuded 2,000,000 acres of their trees, an idea so preposterous that no one, except perhaps a timber agent, would entertain it for a moment. If a few thousand acres of these stunted and straggling forests have been so cleared off, this is probably about the extent of these alleged depredations. As the non-mineral public lands, valuable chiefly for their timber but unfit for cultivation, are sold at the rate of \$2.50 per acre, the injury done by stripping these sparsely timbered mountains of their trees could in no event be large.

It was evidently the intent of the Act first alluded to that the parties therein named should be permitted to use all the timber required for their several purposes.

It was evidently the intent of the Act regulating timber-cutting on the public mineral lands that the occupants of those lands should be permitted to cut and use all the timber required for their several purposes, yet the course pursued of late years by the Secretary of the Interior and the Commissioner of the General Land Office would seem to evince on their part a desire to frustrate such intent.

As evidence of this take the ruling of Commissioner Sparks, deciding that the charcoal-burners must not make use of dead and fallen trees, or pinon found on the public domain, and

this, even in the ore-smelting districts, where there may be little or no other use for this sort of wood, but where for the smelters charcoal is indispensable. The Commissioner holds the opinion that it would be better to let this timber remain where it is till it finally rots or burns up, greatly increasing meantime the danger of forest fires, than to have the carbon-aros convert it to such beneficial use. There may be law to warrant such decisions, but how about the practical sense of the thing? It must be inferred that the timber so taken was found on non-mineral lands, otherwise the use of it for the above purpose would be warranted by the law already quoted. But even then, as the removal of these dead trees could result in nothing but good all around, there was no need for the Commissioner interposing to prevent it. Every public officer, being empowered with a certain amount of discretion, is expected to exercise the same in the discharge of his official functions.

Aliens and Mineral Lands.

Representative Hermann of Oregon, from the Committee on Public Lands, reported favorably to the House on Tuesday the Senate bill providing that the Alien Land Act shall not affect the title to mineral or mining claims in the Territories, which may be acquired or held under the mineral laws of the United States, or any mills or other improvements thereon. The committee has added an amendment to the bill providing that the Act shall not be construed so as to authorize the acquisition or holding of any coal or iron lands in any of the Territories of the United States by any alien or foreigner.

The proposed amendment will have the effect of withdrawing some of the opposition to the bill, and will be rather a benefit than otherwise. It is the gold, silver, copper and lead mines in the Territories that the miners want to be able to sell where they can get the best price. The coal and iron interests of the Territories are less important, and it is well that no large tracts be sold to aliens. But the English companies that hny mines of gold, silver, copper or lead generally work them in a vigorous, systematic manner, put up big reduction works, employ many men and benefit the region where they operate in many ways. This has been the experience so far. They pay less attention to "stock" operations than our own people are accustomed to. It was a hardship to prospectors and miners in the Territories to pass a law which prevented their selling their mines to foreigners if they had the opportunity. We get big prices for our properties on the English market, and a great deal of harm was done to the mining industry when these sales were stopped. It is to be hoped that the proposed change in the law will be made at once.

To Investigate the Debris Problem.

A Washington dispatch states that Representative Biggs' bill, providing for an appropriation of \$100,000 for an examination and survey of the rivers and lands adjacent thereto in California, will be recommended for passage by the Senate Committee on Mining, in the hope that information looking to a settlement of the debris problem will be the outcome of the work, which will be prosecuted by Government officials.

It is well that this subject should be thoroughly examined by competent and disinterested engineers. It seems somewhat strange that there should be organized opposition to the measure on the part of certain Californians. If it is possible to permit the hydraulic mines to again be worked without injury or detriment to other interests, we ought to know it. If it is not possible, of course matters will remain as they are. There is no reason, however, why the subject should not be properly investigated. It costs the State nothing, the Government paying the bills. There is, moreover, no objection on the part of the Government to do this, since it sold the auriferous gravel land to the miners, who bought in good faith. Then the U. S. Courts enjoined them from working the ground. In fact this scientific examination of the problem should have been made long since. It will be a great benefit to the State to have the whole matter studied and then definitely settled one way or the other.

COPPER ore is being shipped from Pioche, Nev., to Salt Lake.

Lower California Gold Mines.

We had a conversation this week with Geo. E. Mills, who has just returned from the gold mines in Calmali district, Lower California. These mines are about 260 miles south of Esenada by land. From the seaport of San Domingo they are 50 miles inland, over a sandy road, with one large mountain to cross. Mr. Mills has a very poor opinion of the mines, which he says amounts to little, though many people have been going into the district, some of them even walking all the way from Esenada and San Diego, taking from 25 to 35 days for the trip. The placer mines are played out. The old Mexicans and others who have been working there have been using dry washers, but many have abandoned the ground and left their washers and implements behind. Shot gold is found, the fine gold of course being lost. Three men working a claim there said they were making from \$5 to \$7 a week.

The quartz mines are "pocket" claims, and from some of the pockets very rich ore indeed is found. The veins run from one to three feet in width. On some claims they have sunk 40 feet, but nothing rich has been found except at or near the surface. Some of the ore will soon arrive in this city and is not enough to attract attention, but there is very little of this sort of ore to be had. There is a five-stamp mill in the camp which has been at work some years.

A good many men have been disappointed by going to these mines. There are not more than 60 men in the permanent population. Mr. Mills saw some men come in nearly barefoot, having walked the whole 650 miles to get there. They get away as soon as they can. It is only occasionally that a steamer or vessel comes to San Domingo to bring freight. Mr. Mills himself waited from the 19th of April to the 1st of July before he got a chance to get back to Esenada by sea. The common experience is that the longer one stays the less money he has. Provisions and clothes are very high. Corn is 12 cents a pound; deer meat, 37 to 40 cents. A four bit pair of overalls costs \$4, and everything else in proportion. The gold is worth \$18 an ounce, but has to be sold for goods at the store, so it really brings about \$5 per ounce, considering the prices charged.

Some of the men who leave—for there is no work for them—go over to the copper mines above Muleje. The English company's mines on the gulf side, where the seaport is Los Angeles, have atopped work.

There are about 12 quartz mines opened at Calmali. An effort is to be made to sell the claims in this city, and the owners expect to get about \$300,000. If the mines showed any permanence, with ore half as rich as the pockets have yielded, they would be very valuable. As it is, however, no value can be placed on them, everything depending on the occasional pockets which are found.

THE FOREST HILL MINE FIRE.—The fire in the Forest Hill mine, in Placer county, which cost J. Bowring and Robert McKechnie their lives, was caused by the pipe from the blacksmith shop setting the timbers on fire. The shop is located 5800 feet from the mouth of the main tunnel. Over 70 men were inside the fire in the tunnel. They retreated to the side drifts, where the air remained pure, and when the fire subsided, and they started to rush outside, they were horrified to find the bodies of over 30 men who had rushed in in the hope of rescuing the inside miners, and had suffocated. All but the two named above were reanitated.

In making test of Occidental tin ore at the Dakota School of Mines one day recently, the fact was developed that it carried a considerable quantity of gold. This was a revelation even to the men who performed the work upon the mine.

THE Maxwell Creek mines, which were taken to London some time ago by Wm. Letts Oliver, have, it is said, been successfully placed in strong hands on that market. The Big Oak Flat ditch will be run in connection with the mines.

THE Frisbee wet mill, illustrated and described in the PRESS not long since, is in successful operation at the Copper Queen mine, Arizona, reducing ore for concentration. We shall shortly give a report of the results accomplished.

Big Assays.

We don't get so much excited in California over gold ore "assaying" \$60,000 to the ton as we do over that worth \$60; and, in fact, \$15 and \$20 rock is pretty good in these days, and pays well if there is enough of it. Whenever we hear of people finding \$50,000 or \$60,000 ore we think some fellow has found a "specimen" or a little pocket. It is pocket mines generally that show huaches of ore of great value, but pocket mines and specimen mines do not bring high prices as mines. In such claims it is well to count on what is in actual sight and nothing more. The old-fashioned \$1000 a ton rock we used to hear about is seldom mentioned in these days for fear those who know anything of the subject will "copper" the statement and have nothing to do with the man who speaks of it.

These remarks are called out by the dispatches from Michigan, where we are told men this week brought in gold rock from the Lake Superior Iron Co.'s mines. They have 300 pounds of the rich rock. It is estimated as worth way into the thousands, and some say the assays will show \$60,000. We don't often assay that kind of stuff in this country, but take a mortar to find out the value. "The quartz vein on which the shaft was sunk was discovered three years ago by Ishpeming men, but, with the exception of exploding one charge of dynamite, which exposed a rich pocket of gold-bearing quartz, nothing was done, because the property was owned by the Lake Superior Iron Company, which would not lease nor sell it. Last summer the company put a few miners at work on the property, and a test shaft was sunk about 18 feet, at the bottom of which a small pocket was struck which produced gold-carrying rock which assayed \$40,000 to the ton. All work was suspended then and nothing done until two months ago. Rich rock has been encountered all along, and the wonderful find has thus set the people wild. The shaft is now down 22 feet, and is about 18 feet wide at the bottom."

This is rather a curious shaped "shaft," 22 feet deep and 18 feet wide. They must be going to have a triple compartment outfit on that. But it is easy to get up an excitement over gold in the East. Out here when a fellow strikes a pocket like that he is congratulated and people hope he will get another, but they are by no means sure of it. Some pocket mines in this State have paid handsomely, but there are so many chances to be taken that it is seldom any big price is paid for a mine of that character.

The Prescott Journal-Miner declares that what Arizona needs in the way of the development of her mines is men of means who are willing to invest their capital in legitimate mining enterprise, and not kid-gloved mining men, who take hold of such a proposition to float the stock among their friends, regardless of the merit of the property.

CHARLES REED was killed last week by a rock falling upon him in the upraise from No. 9 tunnel, Sierra Buttes mine, Sierra City.

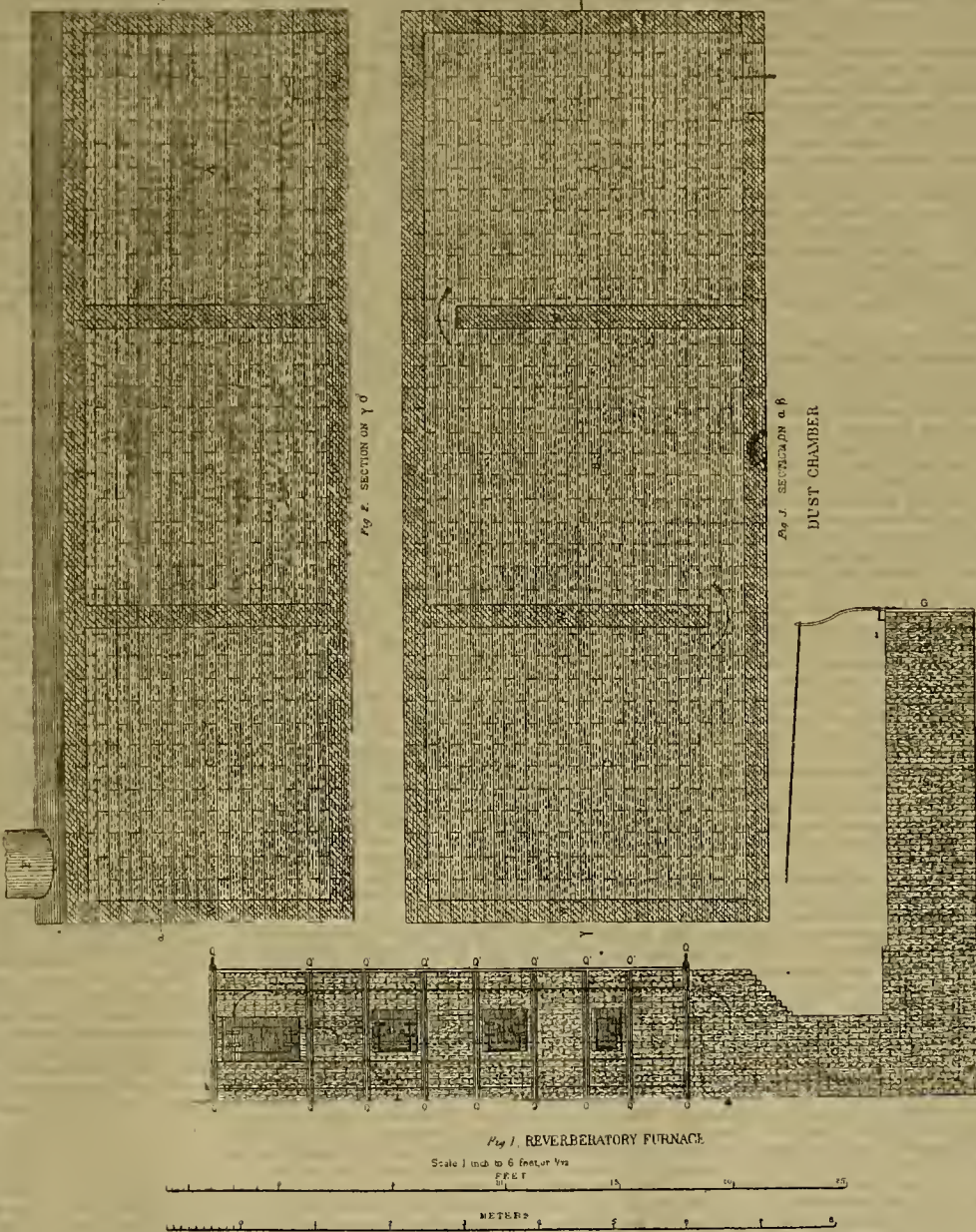
The Late H. P. Gregory.

Henry P. Gregory, who died at his home in Oakland on Tuesday night, occupied a position of prominence among the dealers in machinery on this coast. In his death, the community loses a valuable member and an honorable and upright gentleman. Among his associates he was well liked for his genial and pleasant manners, and he had acquired an enviable reputation in business circles.

After having been employed with Treedwell & Co. for some years, he went into business for himself in 1874, under the firm name of H. P. Gregory & Co., and afterward established branch houses in Portland, Oregon, and Sydney, N. S. W. His brother, Siles P. Gregory, was

fine ranch near the shores of Monterey bay, between Aptos and Soquel, where he had a comfortable country residence with pleasant surroundings.

Mr. Gregory entered as a volunteer in the U. S. Navy at the beginning of the war, and served as an engineer. He was in active service and in many of the great naval battles. At the close of the war he came to this city. He was a member of the Bohemian Club and the Pacific Club. He was also a member of the Loyal Legion, the Ancient Order of United Workmen, the Knights of Honor, and a Knight Templar. His cheerful disposition, natural politeness and pleasant manners endeared Mr. Gregory to a wide circle of friends. His business associates will join with his personal friends in



REVERBERATORY FURNACE AND DUST CHAMBER AT LEADVILLE.

associated with him in business until about a year since, when he died.

The firm started in a small way on First street between Market and Stevenson, but soon enlarged their business and moved to the foot of Market street. Soon after the completion of Union block, they took the corner store on Fremont and Mission streets. The premises are the finest in the city for the class of business conducted, and a very large and varied stock is carried. Mr. Gregory made frequent visits East and abroad, and secured many valuable agencies, which he conducted with marked ability. Being an enterprising man, he has built up a fine business from very small beginnings. Ever since he was established for himself he has been a constant advertiser in the PRESS, and was well known, personally, to many of our readers.

Mr. Gregory was a man in the prime of life and with everything to make life attractive. Successful in business, he had made for himself one of the pleasantest homes in Oakland. He was peculiarly a domestic man and enjoyed his home life. He leaves a widow and three children, two boys and one girl. Mr. Gregory has of late years greatly interested himself in his

paying the last tribute of respect to his memory.

A BALCONY will soon be built around the museum-room of the State Mining Bureau. The balcony will be placed about ten feet from the floor, and will be nine feet broad. The want of the additional room thus obtained has long been felt, as all the available space had already been crowded with specimens.

THE mining machinery is being removed from the Noonday and Red Cloud mines, Bodie, and taken to Anaconda, Montana, but Capt. John Kelly says there will be more machinery arriving in Bodie within a short time than has ever been hauled out of the camp.

A CALIFORNIA company with \$15,000,000 nominal capital is about to expend \$1,000,000 in a plant for developing iron, coal and limestone deposits at Iron City, Utah Territory.

THERE is a quartz vein in Marin county which has ore assaying $1\frac{1}{2}$ ounces gold and 14 ounces silver to the ton, but the mine is not developed to any extent.

The Launch of the Charleston.

The launch of the steel cruiser from the shipyard of the Union Iron Works, on Thursday evening of last week, was an occasion which will long be remembered in this city. No such immense crowd ever before gathered in this State at anything connected with our industrial interests. All the roadway leading to the works were crowded with people; the steamers, tugs, yachts, and all sorts of craft were loaded with passengers; the shipyard was filled with an expectant multitude, and from every point of vantage were masses, crowds and groups of people to watch the launch.

We have before described the vessel, which is still incomplete, the hull having been launched to make room in the yard for the other cruiser which is to be built. The arrangements for the launch were perfect, and there was no delay or hitch of any kind. At the appointed hour the huge mass of steel slid majestically and smoothly down the ways into the bay, amid the howling of whistles, firing of guns, and shouts and cheers from thousands of people.

It must have been a proud moment for Irving M. Scott, the man to whose energy the whole thing was due. He and his associates were busy with the preparations until shortly before the appointed hour. On a platform near the bow were the Governor of the State, the Mayor, Supervisors and Federal and State officials, the officers of the army and navy and the Government band. Miss Alice Scott christened the vessel. As the great hull moved slowly down the ways, the band played "The Star Spangled Banner," and the music inspired the vast crowd of people in the yard to join their voices in the national song. As soon as the launch was over, cheers were given for all who had been prominently identified with the event.

No more successful launch ever made. There was no delay, and no accident of any kind, and the whole affair reflects credit on those who had it in charge. The people were proud to know that we had in our midst an industrial establishment that was enabled to accomplish so great a work so successfully.

Condensing Chambers in Smelting Plants.

In recent numbers of the PRESS we have given descriptions of the Leadville smelting furnaces from the U. S. Geological Survey monograph No. XII, by Emmons, on the "Mining Industry of Leadville." In the PRESS of May 12, 1888, was given the elevations and sections of Smelter A. On this page we give engravings showing the reverberatory furnace and dust chambers of the same smelter. In Fig. 3 the chamber is seen in horizontal sections, divided into three parts by means of partition walls W, the arrows indicating the circulation of the fumes. Fig. 2 is a vertical section of the same chamber, and the construction and working are shown by the drawings. About 150 tons of dust were collected in this chamber in six months.

The roasting furnace is shown in elevation in Fig. 1, chiefly with a view of giving the dimensions, for it presents no peculiarity in construction. Its width (not indicated in sketch) is 12 feet. The sketch shows the system of bracing by rails; the hinged cast-iron doors d and the dotted lines indicate the internal disposition of the furnace.

The roasting furnace is used at Smelter A for roasting the chamber dust previous to remelting. In the study of metallurgical products, it will be seen that it is an expensive and useless operation, and that it were better, on the contrary, to use it for the roasting of matte and speiss. The former being roasted in heaps, loses a great deal of the silver, and the latter is not treated in Leadville. The main point of interest in this roasting furnace is the flue C, in which a good deal of the product utilized during the roasting is condensed; so that this furnace is admirably adapted for the treatment of matte, accretions and speiss—all products containing a great deal of silver. S represents the stack of the furnace; G the damper of the stack. The ashpot of the furnace is not visible, but is placed at h.

SONOMA QUICKSILVER.—The Great Eastern quicksilver mine, Sonoma county, is shipping upward of 100 flasks of quicksilver monthly. The Mount Jackson mine, adjoining the Great Eastern, has been bonded for \$111,000.

MECHANICAL PROGRESS.

The Secret of Cast Steel.

The history of cast steel, remarks a contemporary, presents a curious instance of a manufacturing secret stealthily obtained under the cloak of an appeal to philanthropy. The main distinction between iron and steel, as most people know, is that the latter contains carbon. The one is converted into the other by being heated for a considerable time in contact with powdered charcoal in an iron box. Now, steel thus made is unequal. The middle of a bar is more carbonized than the ends, and the surface more than the center. It is, therefore, unreliable. Nevertheless, before the invention of cast steel, there was nothing better. In 1760 there lived at Attercliffe, near Sheffield, a watchmaker named Huntsman. He became dissatisfied with the watchspring in use, and set himself to the task of making them homogeneous. "If," thought he, "I can melt a piece of steel and cast it into an ingot, its composition should be the same throughout." He succeeded. His steel soon became famous. Huntsman's ingots for fine work were in universal demand. He did not call them cast steel. That was his secret. About 1780 a large manufactory of this peculiar steel was established at Attercliffe. The process was wrapped in secrecy by every means within reach. One midwinter night, as the tall chimneys of the Attercliffe steel works belched forth their smoke, a traveler knocked at the gate. It was bitterly cold, the snow fell fast, and the wind howled across the moat. The stranger, apparently a plowman or agricultural laborer seeking shelter from the storm, awakened no suspicion. Scanning the wayfarer closely and moved by motives of humanity, the foreman granted his request and let him in. Feigning to be worn out with cold and fatigue, the old fellow sank upon the floor and soon appeared to sleep. That, however, was far from his intention. He closed his eyes apparently only. He saw workmen cut bars of steel into bits, place them in crucibles and thrust the crucibles into a furnace. The fire was urged to its extreme power until the steel was melted. Clothed in wet rags to protect themselves from the heat, the workmen drew out the glowing crucibles and poured their contents into a mold. Mr. Huntsman's factory had nothing more to disclose. The secret of making cast steel had been discovered.

ROLLING OUT CHAINS OF WROUGHT-IRON.—The process, some time since announced, of rolling out chains of wrought iron from the solid bar, has, with certain improvements, been successfully resorted to—the principle of forming the rollers and the process of rolling out a chain being, in this case, similar in some respects to the method employed for coating the links and having them come out together in a chain from a mold. In the latter operation, the flask is made to part equally in four ways, and the chain molded while the links are separated so as to divide the spaces equally between them, giving as little clearance as possible, which will not change their appearance perceptibly—the flask is divided, the chain is moved, and one is cast in the mold. Similarly, a piece of chain is edged out of a bar of iron in an analogous manner, by means of four converging dies. These, in producing a continuous chain in this way, the dies are made continuous by having them formed on the circumference of four rollers, arranged with dies distributed in equal divisions, and the rollers driven by gear wheels, so that the four parts of a link will meet accurately in place; proper clearance is given to the dies, so as to allow the material to leave the matrix freely as the roller revolves. As the blank is carried forward between the rollers, the dies partially press or edge out the links at right angles to each other, breaking the fin or feather edge that is left on the inside of the link.

AN UNSOLVED MYSTERY.—Iron, of all others, is the metal in most general use, and unlike wood and other materials, which "perish in the using," iron when it has served its purpose in one position goes to the foundry or forge, as scrap iron, and returns for some other use as good as new, with very little loss. Old castings are recast in some new form and are no way inferior to castings made of new pig iron. Old rails are re-rolled and come out new. It is only in the form of nails and some other small matters that iron is lost. Now when we observe the millions of tons of pig iron, fresh from the ore, that is added to the stock on hand every year, the mystery is that the demand still remains unsupplied. The constantly increasing use of iron, in all of its forms, would account for the increased output from the furnaces every year, if, like other materials, it perished with the first use; but as it returns to the common stock as new material, why is the demand still maintained?—*Boston Journal of Commerce.*

LOCOMOTIVE BUILDING.—There are 15 private locomotive-building establishments in the United States, which built 1912 engines last year, while the railroad-shops turned out 318. It was the largest production on record, the cost of the locomotives being near \$20,000 each.

MUCILAGE OF ACACIA. made with acetic acid in place of water, makes a good liquid cement. It cannot be used for marble.

Lead-Coated Sheet-Metal Plates.

A Cheap and Valuable Substitute for Galvanizing Iron.

In view of the interest attached to protective coating for sheet metal, it is appropriate to direct attention to a process which has recently been adopted by the Ajax Metal Company of Philadelphia, the coating used by them being lead. The process is worked under patents granted to Mr. Francis J. Clamer of the company, and embraces a special treatment for cleaning and preparing the sheet metal and a separate method of treating the lead-coating bath. It has been found that where acids alone were relied upon to clean the plates—this being the method in current use—the surface of the plate is not entirely freed from impurities; in other words, not chemically cleaned, and the coating subsequently applied will therefore not adhere perfectly. The Ajax Company, therefore, use the acid bath, when it is employed at all, only as a preliminary step in the cleaning process for removing quickly the greater portion of the impurities before thorough cleaning is effected by other means. These form the essential features of their process, and, in cases where time is no great object, the acid bath is entirely dispensed with. The plate to be cleaned, whether having been first treated in an acid bath or not, is placed in a bath of cyanide of potassium and water in about the proportion of six ounces of the former to one gallon of the latter. The plate is then subjected to the action of a galvanic current, being placed in the position occupied by the anode in an ordinary electro-plating bath. The result is a perfectly clean surface on the plate under treatment.

After being thus chemically cleaned, the plate is immersed in a bath of chloride of zinc, made by dissolving metallic zinc in hydrochloric acid until the latter is thoroughly saturated and will take up no more of the metal. This bath prepares the plate for a more ready adhesion of the coating to be applied and constitutes an important step in the process.

The method of treating the final bath of molten lead which is to be used as the desired coating is the subject of a separate patent. We will explain here that lead, while in a molten state, absorbs various gases from its surroundings and from the atmosphere. These absorbed gases prevent the lead from adhering closely to the surfaces of different metals which are dipped into it, and cause the small holes and blisters which are frequently found in ordinary lead-coated sheet metal. Molten lead, furthermore, as many of our readers may know by experience, is somewhat thick and sluggish, and a coating formed in the ordinary way is therefore very apt to be full of ridges, the result of uneven distribution. To overcome all this the Ajax Company treat the lead in a molten state with sal ammoniac, arsenic and phosphate of lead. The sal ammoniac has great cleaning power and drives out from the lead all the gases and impurities which it has absorbed from its surroundings.

The arsenic, by its hardening and solidifying qualities, renders the lead incapable of taking up any further impurities. It has been found, in fact, that it permanently protects the lead against these influences, and the metal may be melted over and over again without losing the effect. The phosphate of lead finally renders the mass more fluid. The combined effects of the three materials on the molten lead have been found to be such as to make it an excellent coating.

In preparing the lead bath, ordinary pig lead is melted in a suitable vessel and covered with powdered charcoal to prevent oxidation. This having been done, there are added for every 100 pounds of lead, first three ounces of sal ammoniac, then one-half ounce of arsenic, and after this three ounces of the phosphate of lead, and finally one-half ounce of borax or similar flux. The substances, it should be noted, are introduced separately and immediately, one after the other, the molten lead being gently agitated in the meantime so as to produce a homogeneous mixture. The plate to be coated with the lead, after having been prepared by the various processes above described, is then dipped into this bath in the same manner as when coating with zinc. If the bath is not needed for immediate use, the lead may be run into bars or ingots and used at any future time. We understand that the proportions of sal ammoniac, arsenic, phosphate of lead and borax may be varied, and the use of the borax or flux omitted entirely. The best results, however, are apparently obtained when the above proportions are retained. We may remark here, incidentally, that the claim of the Ajax Company is that their coating consists of pure lead, and not of any combination, such as tin, lead, zinc and others. Mr. J. G. Hendrickson of the company informs us that a separate company is being organized to develop the process, and will probably be ready for business in a short time. As we understand it, it is proposed to start sub-companies and lease plant rights throughout the United States. A small plant showing the working of the process is in use at their Philadelphia works in a practical way. Mr. Hendrickson further writes that they have advanced far enough to prove that leaded iron or steel can be put on the market at a price fully 50 per cent lower than galvanizing can be done for, with a good profit. The electric cleaning process is said to have a good deal of the labor which is ordinarily required in cleaning sheet-metal surfaces.—*Iron Age.*

SCIENTIFIC PROGRESS.

Face-Reading is not a Science.

The Countenance is not a Reflex of the Soul, but Often Only a Mask.

"Physiognomy is rather a vagary of the imagination than a science," said a prominent student of human nature the other day, "and, therefore," he continued, "I deny that the expression of a man's face is really an index of the person's soul, as it is generally conceded to be, and as the object of language is said to be the concealment of thought, so the expression of one's countenance is but the mask to conceal one's inner self."

"There is a tradition that far back in the days of which history tells us nothing, there was no speech or language among men, but that men read each other's wants and wishes in their faces, and as the world was pure nothing but purity appeared in the expression of the human face. But wickedness crept in and man sought to keep from their faces the evil that was in their hearts, thus preventing the countenance from becoming the index of the soul."

"No," the speaker went on, "I have no faith whatever in physiognomy as a science, for as a science it is fanciful and wild. Take, for instance, the portraits of men who have become famous in the world of statesmanship, philosophy, science, art and letters, and search and scan their faces for traces to mark their fame, and how often you will be disappointed. The same is the case with men adepts in vice, cunning and crime. Little can be told from the external appearance of individuals as to their peculiar traits and characteristics by which they are known to their fellow-men."

"That certain habits of life affix their stamp to face or form is, no doubt, true, but the solution of that condition is not in the reflex action of the mind and soul, but for the reason that a certain set of muscles are brought habitually into play and cause a special development. Is the man necessarily all smiles and laughter who has wrinkles at the outer corners of the eyes and upward-curving lines around his mouth? Yet those are the mechanical lines, which would indicate a merry-hearted man, if the science of physiognomy is true. Those lines are only muscular, simply the result of habit, and may be dictated by the rankest hypocrisy."

"Naturally the brutal and ignorant classes will have coarser features, and will possess brutal and animal faces, generally resulting from inherited qualities, and, therefore, they will do coarse and brutal things. It would be an easy matter to trace a resemblance between the face and the crimes of such people, in whom brutality and coarseness predominate; but where will you find the lines and earmarks of brutality in the faces of the handsome Wilkes Booth or the cultured and elegant Eugene Aram? Look upon the canvases bearing the portraits of the beautiful and angelic fiends that ruled the Emperors of Rome, and you will see only patrician faces, but they brought the empire to destruction."

"Instances of this character might be given indefinitely, but every one who has made a careful study of the subject will agree that the connection between the facial expression and the inner spiritual nature is a very difficult one to trace."—*N. Y. Mail and Express.*

The Direction of Sounds.

The difficulty in determining the true and exact direction of the sounds we hear meets us in various ways. The hunter hears the note of a bird, the hiss or whistle of a deer, and the sound indicate identity and proximity, but not direction. The hunter waits for repeated renewal of the sound to ascertain its exact position, and even then verifies his audition by his vision. The hunter by his campfire may aim between the luminous dots of reflected light, which he knows to be the eyes of a wolf; but he would scarcely be able to aim at or even near that spot on simply hearing the howl from the wolf that owns the eyes. The plainman hears a shout in the distance. He may recognize it as the voice of a comrade, and fix the general direction, as north, south, east or west, but hardly more. He may shout back, and the two may come together; but if it be dark, and there is no fire or other signal, the shouting back and forth must be frequently repeated and varied from a simple to a complex sound, that each may correct the error of his own and, finally, eliminate his personal equation, and the sound will appear to swing, pendulum-like, right and left, with short and shorter strokes, till the comrades come together. How many of us going to the next street, running at right angles to the car tracks, can tell from hearing the bell of the approaching street-car before the car comes in sight whether that car is going north or south? It does not seem that animals can determine the direction of sound much better than man. The sleeping dog, roused by his master's call, is all abroad as to his master's location, and determines it by sight or scent, or both, frequently running in several different directions before hitting the right one. The deer, on being startled by the unseen hunter's tread, is not always right in his selection of the route to get out of harm's way. A flock of geese, ducks or other birds, on hearing a gun, is as likely to fly toward as from the sportsman, if he has kept entirely out of sight, and the flash of his piece has not been seen.

It is a question whether the blind are better able to determine the direction of sound by ear than are seeing people. It is possible that their senses of touch and smell are so highly developed that their instantaneous action with that of the ear give them a decided advantage over seeing people in this matter. I have known a blind man to be so sensible of the current of air put in motion by the speaking of a single word in a room that he could select the speaker by his location, though others were present. So, too, I have known a blind man to locate and identify the various people in the room, he saying he did it by the different scent evolved from each, the seeing people there not being sensible of any scent from any one. And yet he, when standing in the middle of the room with his nose stopped, could not give the direction of one single speaking person.

Professor Alexander Graham Bell reports at Saratoga in 1879 a series of experiments in binaural audition, showing, among other things, that direction cannot be appreciated by monaural observation; that when the source of sound is at the nadir of the observer the perception of its direction is absolutely unreliable, and that not one of the many on whom he tried the experiment had the slightest idea of the true direction of a sound produced beneath him. We are so much accustomed to the aid of our other senses, especially that of sight, that we incline to give more value to audition in determining direction than it deserves. That is one reason why we err so largely when so placed that the eye cannot correct the error of the ear—in fact, many people seem to be unaware that they have any inability to locate sound by the ear until they have learned the fact by experience, and even then they appear to consider marked instances as abnormal.—*Popular Science Monthly.*

THE PHENOMENON OF COLOR.—A writer on the nature and phenomena of color now asserts that, contrary to what has been the general opinion, its causes and effects are determinable solely by the wave theory of light; that color depends, in fact, upon the number of light waves reflected from any object infringing upon the retina of the eye. According to this theory there are in red about 40,000 waves to the inch, and these will strike the eye at the rate of four hundred and forty-seven millions of millions of pulsations per second; in violet there are 57,000 waves to the inch and six hundred and ninety millions of millions of pulsations per second, and the other colors have wave lights intermediate between these two. From all this the conclusion is arrived at that color does not exist either in the object or in the mind or the brain of the observer—it is an effect. This is illustrated by the fact that there can be no appearance of a fire on a desert island where there is no eye within seeing distance; the chemical process known by the term combustion goes on, but there is no appearance of the flame save when its light waves strike upon the retina of an eye.

DRYING EFFECT OF NATURAL GAS.—It has been remarked that the heat of natural gas is drying to a marked degree above the heat from burning coal or wood. The knowledge of this fact enables builders in the cities where gas is to be had to virtually dispense with winter. Inclosed buildings are easily and cheaply heated for the painters and the plasterers, and even exterior consumption of gas is resorted to successfully in some instances to aid the masons. The time is coming when such conveniences will not be confined to the favored regions where the Trenton rock comes up near enough to the surface to be tapped.—*Light, Heat and Power.*

A FRAGMENT OF THE ILIAD.—The explorer of the Fayum, Mr. Petrie, has discovered "a splendid fragment of the Second Book of the Iliad, written on papyrus in the finest Greek hand, before the rounded uncial or cursive scripts came into use. This precious document was found rolled up under the head of a mummy which was buried simply in the sand without the protection of a tomb. It measures apparently from three and a half to four feet in length. The date of the manuscript is about the second or third century. It will be edited by Prof. Sayce."

AN ANCIENT GLOBE.—In the National Library at Paris there is a Spanish globe 350 years old, on which the Congo follows in a remarkable manner the course now given to that river on the maps. All the best maps in the sixteenth century showed the Congo as rising in a lake far inland, while in this century we first tried to identify the Congo with the Niger, and then for many years made it flow north.

THE HORSE.—The origin of the wild horse is traced through tradition to Central Asia as the aboriginal abode of the horse, says Mr. Steele in his paper on "Wild Horses," while our Mexican mustang and bucking broncho are descendants of domesticated animals introduced from Europe. He gives us the date of 1537 as the landing of the first horse in America at Buenos Ayres.

VIRTUE AND VICE.—A scientist has discovered a curious regularity in the geographical distribution of certain virtues and vices. Intemperance is found north of the forty-eighth parallel; amatory aberrations south of the forty-fifth; financial extravagance in large seaports; thrift in pastoral highland regions.

GOOD HEALTH.

Emperor Frederick and Gen. Grant.

The scandalous discussion in regard to the disease, treatment and death of the late Emperor Frederick of Germany, does not indicate a very creditable condition of affairs between the physicians involved in the controversy. In many respects there is a striking parallel between the cases of our own lamented ex-President Grant and that of the Emperor. In both cases the heroism manifested in connection with their terrible suffering and doom was far superior to the valor which each had shown upon the battle-field, greater than that was. With the exception of the case of Gen. Garfield, the history of the world does not afford a parallelism to the profound and world-wide sympathy which was manifested in behalf of these distinguished sufferers. The medical bulletins in each case became for many weeks the one engrossing subject of interest to an anxious world. In both cases the malady was probably known from the first to be cancer and was considered incurable by the physicians in attendance. Some political significance undoubtedly had to do with the decision of the faculty in the case of Frederick. Sympathy and hope against hope kept the real character of Grant's disease in the dark as long as possible. In view of these two notable recoverments, and of the rapidly increasing spread of this terrible disease all over the world, the question naturally comes up, as it has many times before under similar aggravating circumstances,

Can Cancer be Cured?

Hall's *Journal of Health*, one of the ablest and most reliable journals devoted largely to the popularization of matter pertaining to diseases and their prevention and cures, in alluding to this question, says:

Nor is it quite established that cancer is an incurable disease. That there have been cases of cure by methods unrecognized by practitioners of the older schools of medicine is quite well established, and the belief is gaining ground that there is something outside of them yet to be learned in the healing art. But whenever a cure is effected by a specialist it is usual for opposing schools to dispute that the patient was really a cancer subject.

We would call especial attention to the above paragraph from so distinguished a source. It is but reiterating what we have often said in these columns. Further, in the same direction, we quote from one of the most reliable medical works extant—a standard English book entitled "Cancer, its Varieties, their Histology and Diagnosis," by Henry Arnott, F. R. C. S. On page 77 that author, in speaking of the various forms of growths commonly called cancers, says:

For it is extremely unlikely that all these tumors are to be met with the same remedy. Granted that so-called "constitutional remedies" have always failed to cure new growths, it is yet a matter of history that hosts of tumors have been permanently arrested in their progress, and it is also a matter of history that among these have been included not a few instances of genuine cancer.

The same author, on the second page of his preface, says:

Hitherto our modes of treatment of cancer have been, confessedly, unsatisfactory; and so long as our ignorance of the pathology of the disease prevented us from being able to suggest a reliable prognosis in most cases, the result of the various remedies from time to time proposed could not possibly be weighed, for, when a remedy appeared to be successful, there always remained a doubt as to the nature of the tumor treated, and, consequently, of the share of the remedy in its removal.

In regard to the latter portion of the above paragraph, we would remark that the evidence which has been heretofore given in these columns would seem to set at rest all doubts as to the possibility that any mistake could be made in regard to the character of many of the "tumors" which have been cured in this city. We have given the names of patients and the attending and operating physicians in quite a number of cases where "tumors" have been removed once, and sometimes twice, by our most distinguished surgeons, whose reputations will not admit of a doubt as to their knowledge of the character of the tumors after they have removed them. In the cases referred to, the "tumors" have come again, presenting precisely the same characteristics, have been pronounced most unmistakably cancerous, and have been cured by constitutional treatment, aided to some extent by simple, painless, outward ap-

plications. The character of the physicians referred to, we repeat, will not admit that they could have made a "mistake" in their diagnosis.

We hold that it is due to science and humanity that such cases or similar new ones, which may be prevented, should be subjected to a careful consideration by a competent medical commission. If the faculty continues to refuse to take such a step, the State authorities will soon be called upon to act in the matter. Money from the State Treasury is being applied by the State Board of Health in many ways of infinitely less importance than that which is proposed.

State Health Report.

The report of the State Board of Health for June shows a very satisfactory condition for the month. Reports were received from 87 cities and towns, aggregating estimated population of 702,050. The total number of deaths was 964, a percentage of 1.3 per thousand for the month, or an annual death rate of 16.3—the lowest death rate reported for the year.

Among the diseases enumerated, consumption as usual leads with 156 fatalities; heart disease follows next with 67; pneumonia counts 66; diseases of the stomach and bowels count 117. These latter are more or less preventable and are almost always brought on by excess in diet or bad hygienic surroundings, such as high temperature, etc. It is hoped that in the near future the time will come, as it surely should, when our young people will be more thoroughly educated in matters pertaining to health—when such matters will be considered quite as essential in education as reading, writing and arithmetic. Under such circumstances the application of such knowledge will so control the appetites, habits and habitations of our people as to reduce all preventable diseases to their minimum.

It is a matter of regret that the program of discussions at the last week's session of our National Educational Association did not include the subject of hygiene in our common schools among the numerous educational problems to be considered by that body.

The other diseases not enumerated above were as follows: Alcoholism, 9; erysipelas, 1; cerebro-spinal fever, 6; remittent and intermittent fevers, 7; typhoid fever, 35; whooping cough, 5; measles, 2; scarlet fever 9; croup, 8; diphtheria, 20; congestion of lungs, 10; acute bronchitis, 16; other causes, 417. Among the latter, 12 are set down for cancer, which is an unusually small mortality from this cause.

FASTING AND POISONS.—It has been ascertained by careful experiments conducted by M. Roger that poisons lose one fifth of their toxic power when taken into the system by fasting.

USEFUL INFORMATION.

FLOWERS IN CHINA.—The Chinese have a passion for flowers. You may see on the hundreds of canals that cut up the country around Shanghai, boats whose dingy and miserable appearance betokens the poverty, even the beggary, of their occupants; and yet near the stern, on top of the sawhang or cooking canopy—the "galley"—you will see from two to a dozen pots of flowers. Little Chinese girls nearly always place a sprig of some bright flower in their glossy tresses of raven black, and they sometimes show a good deal of taste in the arrangement of their nosegays. Just about the first of February, or near the Chinese New Year, one may see men and boys selling branches of a small bush that bears a yellow flower, somewhat resembling the spice hush flowers of Virginia. This flower has, to a Chinese, associations bright and pleasant as those that clung around the far-famed Hawthorn that bloomed in old England on "Old Christmas Day." You can buy in the market for a few cents, or cash, a little flower pot with a few bulbs of daffodil in it, and by keeping it in the window of your room, soon have a few bright-looking flowers. The Chinese do not plant in their parks such elaborate flower-hats as the Americans and Europeans, but they are very fond of pot flowers.—*Vick's Magazine.*

ARTESIAN WELLS IN NEW YORK CITY.—It is said that there are over 1000 artesian wells in the city of New York. Many establishments, such as breweries, malthouses and manufactories, which require a large supply of water, have found it to their advantage to sink wells so as to save paying the city water rate. The wells are not always successful, for the projectors cannot always tell the nature of the formation they are going to bore through until they get there. A contractor agrees to sink a well at from \$6 to \$12 per foot, according to the hardness of the strata he has to go through; then he goes to work with the same methods perfected in the oil regions, and bores at the rate of about 20 feet a day, and after going down about 400 feet he probably strikes water, though sometimes not until much deeper, and sometimes not at all. The one which discharges the largest amount of water is located at the foot of West Thirty-ninth street, which,

while it is only 550 feet deep, discharges 90,000 gallons daily. The deepest well is at Third avenue and Sixty-seventh street, it being 1250 feet, and it only makes a daily average of 10,000 gallons. These wells vary very much in depth, and the depth of the well is no indication of its capacity.

A CURIOUS INSTRUMENT.—A writer in the *Chicago News* says: It is a curious thing that the Italian ocarina, or earth-flute, has not received more attention from music-lovers in this country. Of course it is sold in the stores here, and you occasionally hear it in a minstrel show, but not one man in a hundred knows anything about it. I have heard it played in Italy, and the music from a quartet of the instrument is exquisite. Its range is limited, but the quality of its tone when skillfully played is pure and queer. It has a pastoral flavor, reminding one of piping shepherds, and a classical environment. The ocarina is very simple. In shape it is something like a pear or a small gourd. It is made of baked clay. Its range is about 12 notes. No instrument can be more easily learned, for it almost plays itself when one has mastered the scale, and there are no keys nor any elaborate fingering to embarrass one. The North Italian peasants use it constantly in the fields, and when you hear one of their peculiar melodies from a practiced quartet you wonder such simple means can produce so beautiful a result.

EAGLES PURSUE AND DESTROY DEER.—Capt. Thomas Frazer of the Argyll and Sutherland Highlanders writes to the *London Field*: On March 22d, as my father's Stroneldrigg keeper, John Rose, was walking over his ground accompanied by Lord Govat's keeper, they saw five red deer leave a small piece of birch wood and stand looking about them for a little. Three golden eagles appeared and immediately attacked one of them—a hind. She immediately bolted at full speed, followed by the eagles, and after going about 300 yards, one of the eagles drew himself together, hovered, pounced and fixed on her head, holding on for about five or six strides, when she fell head over heels, and thus ridded herself of the first eagle for the time. This occurred about a dozen times, the eagles coming to the attack in turns. In about ten minutes the hind seemed exhausted, and then the keepers were able to get up to her, finding that the poor beast was quite stupefied, her left hind leg broken, her tongue hanging six inches out and her mouth open.

THE HORSES OF JAPAN are not numerous and are used for saddle purposes and for the army. They are mostly of the pony build. They are the most gallant brutes on earth, as every lady horse they meet on the thoroughfares calls forth all their chivalry. The saddle horses go when they please and stop when they will, and are all shod with iron; all others, as well as the park cows and bulls, have their feet protected by a shoe of straw, and very excellent shoes they are. The straw sandals for a man cost about 1½ cents of our money, and a full set of shoes do not cost but a trifle more. In some parts of the roads they are literally padded with worn-out shoes and men's sandals. Whenever a wearer finds his foot protection too much worn he discards it and dons another, of which he usually has an extra pair, and the animals of burden are served the same way. The mares are employed in raising colts and carrying packs.

HOW TO PREPARE AND COLOR CALCIMINE.—Soak one pound of white glue over night; then dissolve it in boiling water and add 20 pounds of Paris white, diluting with water until the mixture is of the consistency of rich milk. To this any tint can be given that is desired. Lilac—Add to the calcimine two parts of Prussian blue and one of vermilion, stirring thoroughly and taking care to avoid too high a color. Gray—Raw umber, with a trifling amount of lampblack. Rose—Three parts of vermilion and one of red lead, added in very small quantities, until a delicate shade is produced. Lavender—Make a light blue and tint it slightly with vermilion. Straw—Chrome yellow, with a touch of Spanish brown. Buff—Two parts spruce, or Indian yellow, and one part burnt sienna.

A NEW FUEL FOR THE PRAIRIES.—An inventive genius of Pocahontas, Ind., grinds corn-stalks and coarse prairie grass together and moistens them with water. When this compound has been reduced to pulp he presses it into blocks 12 inches long and 4 inches thick. When these are thoroughly dried they burn readily, and, it is claimed, give more heat than the same amount of soft coal.

JAPANESE NEWSPAPER REPORTERS must have good memories. It is said that they do not write anything themselves, but gather the news and tell it to the news writers. Japan has 250 newspapers, 1000 miles of railway and 2000 or 3000 miles of telegraph line.

RAPID INCREASE OF VALUES.—The assessment-roll of Fresno county for 1888 shows a total of \$38,657,000. In 1887 the amount was \$16,922,586. According to the school census, the population of the county is fully 40,000.

IT PAYS.—It is said that Ignatius Donnelly has made \$100,000 from the sale of his book, and yet there are those who call his alleged discovery a failure.

ENGINEERING NOTES.

THE NOVA SCOTIA SHIP RAILWAY.—Mr. Benjamin Baker, one of England's most celebrated mechanical engineers, recently visited the Eastern States and Canada in the interest of the proposed ship railway across the northern portion of the peninsula of Nova Scotia. Mr. Baker is an enthusiastic supporter of ship railways. While on a visit to Pittsburg, he met Col. James Andrews, the chief engineer of the Tehuantepec Ship Railway Co., to whom he remarked: "My visit to America is to submit the plans for a ship railway across the isthmus of Chignecto, in Nova Scotia, to the Minister of Public Works of Canada. They have met with his entire approval, and I sail for London on Saturday to make a report to the syndicate of English capitalists who are backing this scheme. The work on this railway will likely be commenced in the coming month of July, and will be finished, it is expected, within two years' time. The total outlay will be \$5,000,000, all of which has already been subscribed, the Canadian Government guaranteeing in return an annual dividend of \$175,000. The railway will be 17 miles long, and, owing to the heavy tide in the Bay of Fundy, which rises at times as high as 70 feet, ships will have to be raised 42 feet by hydraulic pressure. The largest vessel that we will be able to take across will be 2500 tons burden. The Tehuantepec railway will endeavor to carry ships of 4000 tons burden, but they will have to be raised only 14 feet. In other respects the smaller railway in Canada will be similar to the one in which Col. Andrews is interested. This Canadian road will be of much benefit to the marine traffic between the Gulf of St. Lawrence and American ports. It will save a distance of 600 miles of ocean travel. I think that the ship railways will be a success."

DE LESSEPS AND HIS CANAL.—De Lesseps is either the most sagacious or the most fortunate of engineers which the world has produced. No other man ever lived who could have pushed such an enterprise as the Panama Canal to such a favorable point of success as that great work now holds. The work has been carried on under most discouraging and unexpected obstacles, both physical and financial. More than once the best engineers have thought that a crisis had been reached which no energy or skill could possibly overcome. But De Lesseps has triumphed every time. The recent reported failure of the lottery scheme and the violent opposition of a heavy financial syndicate, seemed, a few days ago, to have crushed out all possibility or hope of success; but late telegrams announce that the great engineer has once more triumphed, and is now in a position to fairly command success. He has become reconciled to Christophel, Governor of the Credit Foncier, whose persistent opposition was the principal cause of the great difficulty lately in placing Panama lottery bonds. The Credit Foncier will now receive 120,000,000 francs, the sum which is necessary for the company to meet its regular payments due on bonds. The opposing interests are harmonized, and there will be no more troubles with the new loan.

THE EADS JETTIES.—A recent examination of Captain Eads' jetties on the Mississippi, below New Orleans, shows that they are entirely successful in preserving the depth of the channel. For two and a half miles they reach out into the gulf, opening a broad channel navigable by steamers drawing 30 feet of water. The outer line of defense against the encroachments of the waters of the gulf, which was made of artificial stone, proved insufficient, as both sea and sand broke over it. Then an inner line of defense was made by driving two rows of cypress piles deep into the sand, laying a willow mattress between them and loading it down with loose rock. The sea and sand continued to break over the outer stone wall, but as each wave receded the sand was imprisoned between the inner and outer walls till a barrier was formed, which promises to withstand the ravages of the gulf storms for all time. Behind the right-hand jetty a great stretch of shoal has gradually grown into solid beach, extending its shore-line seaward till it is nearly flush with the extremities of the jetties.

THE LARGEST DRAWBRIDGE in the world is now being erected by the Baltimore & Ohio Railroad Company over the Arthur Kill. This draw is to be 512 feet long, allowing a clear space of 200 feet on each side of the draw between the piers. This bridge will give to the Baltimore & Ohio and other trunk lines access to 10 miles of water-front of Staten Island. The entire length of the bridge from shore to shore is 800 feet and its height is 30 feet. The draw, which is operated by steam-power, alone weighs 450 tons. The total cost of the structure is \$450,000. Trains will pass over the bridge in December next.

DETERIORATION OF STORAGE BATTERIES.—It is reported that the storage batteries on the Brussels tramway have deteriorated so that the cost is increased to nearly 11 cents per car mile, as against 10 cents for horse-power.

There is no doubt that electric railways are growing in popularity. The advocates of other systems must look to their laurels.

The South African diamond-fields last year yielded gems valued at over \$20,000,000.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH CONSOLIDATED.—*Ledger*, July 21: A report was current last week to the effect that the mine was to be opened on Monday last, but that day passed without anything being done in that direction. It is generally believed that the fire is out. It is said that it would be next to useless to open the mine now, as by the time they got it in running order the failure of water supply would compel them to close again. Under these circumstances it is perhaps thought best to keep the mine closed, and thereby insure beyond a doubt the extinction of the fire, until the approach of the fall rains gives a promise of enabling the machinery to be kept running. Nothing, however, is definitely known as to the intention of the managers.

AMADOR GOLD MINE.—The superintendent of this mine hands us the following account of operations: While this company does not work as many men as some others on the lode, yet it keeps steadily at it, with a force of about 20 men. The rock in the mine of late has been very hard, and the work in sinking and drifting has not advanced as fast as we would like, but now that we will soon have three National drills at work in the mine, we will be able to make much better progress. The compressor, wheel-pipe and lumber are now on the ground, and millwrights are at work setting it up, under the supervision of J. B. White & Co., who have just finished the liex 40-stamp mill. The south or shaft No. 3, where the large hoisting works are to be erected, is down 180 feet. The south drift from shaft 1 to connect with the south shaft is in about 210 feet, and the west crosscut from shaft No. 1 is over 350 feet. We expect to cut the west vein about 30 feet further on. The company has secured a fine mill-site from the Amador Queen, at the lower end of the Doyle mine, where it gets 400 feet pressure for power, which will save the company at least \$1000 a month in water bills. The company is now grading for the mill, and lumber is being delivered on the ground. A force of men is at work on the road to the mill-site. The contractors, J. B. White & Co., will commence on the mill as soon as the compressor is finished. The Pacific Iron Works of San Francisco has the contract to furnish all the machinery. A large rock-breaker of the Gates pattern, with a capacity of 300 tons daily, will be put in the mill 90 feet above the lower floor.

MISCELLANEOUS.—W. G. Anderson informs us that the New York claims, three miles southwest of Jackson, are looking well. The tunnel is being pushed ahead, and rock of good grade has been taken out. The Live Oak mine near Stony creek is also looking more prosperous than ever. The drift at the depth of 180 feet in the main shaft has revealed the ledge richer and larger than heretofore encountered.

SUTTER CREEK.—*Cor. Amador Ledger*, July 21: Sinking in the Wildman is making rapid progress. The ground is found to be quite soft, and hence the deepening process goes ahead speedily. There are two shifts of eight hours each employed in sinking. Another shift of eight hours is employed in hoisting rock for the mill. By this system they expect to keep the mill running steadily, and thereby take out sufficient gold to defray the expense of sinking.

Butte.

SPRING VALLEY MINE.—*Oroville Register*, July 21: This rich and well-known mine is having a streak of hard luck this year between injunctions and attachments. Supt. Gregory has made it pay handsomely, but so soon as the mine released from one lawsuit than another comes forward. While we have hopes that Mr. Gregory will be able to get into smooth sailing after a little with his big craft, yet we have serious doubts about the mine being able to stand the storm that is now breaking over it.

Calaveras.

LEONARD.—*San Andreas Prospect*, July 20: It is reported that the Leonard quartz mine will soon be opened, as arrangements are now being made to develop this valuable piece of property. Excellent rock is already in sight and as the shaft is being sunk deeper the prospects are more and more flattering. The new steam engine to be placed on Blue Lead Spinolet & Co. mine was steamed up Tuesday evening and gave entire satisfaction to the owner. The Thorn mine is making great progress. Hoisting works are now being erected, and the mine is already working night and day shifts.

El Dorado.

SUSPENDED.—*Georgetown Gazette*, July 20: We understand that work at the Alpine mine has been temporarily suspended. Mr. Morton, the superintendent, has been in poor health for some time, and work on the mine has been stopped for awhile to allow him to regain his health.

Inyo.

SODA WORKS.—*Index*, July 18: Mr. John Fiehm tells us that the Inyo Development Co. has recently erected a 30-foot windmill for the purpose of pumping water from Owens Lake into the evaporating vats. The water is raised 15 feet in quantity, sufficient to fill the flume, which is two feet in width and 20 inches high. There are about 15 acres of vats which are filled to the depth of six to ten inches and evaporate in 24 hours. As there is wind every evening, the windmill does about all the work required in raising water, but when it is found insufficient the steam engine is used. It is understood that the Inyo Development Co. will soon erect soda refining works at or near Keeler.

BISMUTH.—*Independent*, July 21: A prospector named Cunha has made what promises to be a lucky find over near Deep Spring, in the Inyo range. He struck a vein of metal that was new to him and he couldn't tell what it was. He sent samples to Selby & Co., who assayed them and reported that the metal was bismuth, and the ore carried 50 per cent of that metal. Cunha is now taking out a quantity of the ore which he will send to Selby & Co. as a working test. There appears to be a large body of the ore in sight.

Lassen.

HAYDEN HILL.—*Lassen Mail*, July 21: There are two 10-stamp mills at work here (Harbert & Lewis having added their battery to that of Howard

& Preston), and one arastra, which is operated by Flucet and Geo. McFarland, and a little of the hidden treasure is unearthed day by day, adding to the wealth of the country.

Napa.

THE AETNA MINE.—*Calistogan*, July 20: Business at the Aetna quicksilver mine is again quiet. The furnace was shut down more than two weeks ago, and the usual cleanup following such act was finished Saturday last, at which time the company had on hand 100 flasks of quicksilver. Fifty of these were shipped to San Francisco Monday last. Mr. Rhodes, the superintendent, hopes to find more cinnabar, and some prospecting is being done, but parties interested in the mine do not feel disposed to risk much capital looking after more ore. A great deal of metal has been taken from the Aetna company's ground during the past few years, and stockholders must have realized very fair profits.

Nevada.

A GOOD MINE.—*Nevada Herald*, July 20: Melville Attwood went down into the Nevada county mine to-day and was well pleased with the appearance of the ledge at the bottom. Though small, it has every appearance of a fissure vein, and the rock is of unexceptionally good quality. Mr. Attwood speaks encouragingly of the prospects there. He has several times visited the mine when it was in operation and says it is undoubtedly a good mine and would pay well with systematic work and good business management. Tributaries in the Gold Tunnel and California ground have made a crushing of about 20 tons, which yielded in the neighborhood of \$30 per ton.

WASHINGTON DISTRICT.—*Grass Valley Union*, July 20: Alf Tregido, who is superintendent of the Washington and Blue Bell quartz mines in Washington district, and who was in town yesterday, spoke well of the mining outlook of that section of the county. He said besides the mines under his superintendence the Yuba mine was running regularly, making the number of stamps constantly going at 45, and that there is a likelihood of the Eagle Bira mine starting up again this season, which would add 20 more stamps to the milling capacity of the district. There is considerable prospecting work going on all the time, and the district is receiving much attention from mining men, as although the ores are generally of low grade the lodes are large, and water-power affords cheap milling facilities. The mines now operating are doing well, as ores yielding only \$6 and \$8 per ton can be milled and mined at a good profit. There is no question that the Eagle Bira is a valuable mine, and its present idleness is owing to the unbusinesslike methods on which it is conducted, and not from the unproductiveness of the mine.

Placer.

MAYFLOWER.—*Placer Argus*, July 21: F. Chapellet, superintendent of the Mayflower, reports good gravel at the Live Oak, some of it paying as high as \$5 to the pan. The company has just reached the rim where the way was anticipated.

BREECE & WHEELER.—Work was interrupted in the Breece & Wheeler mine at Bath last week, by the falling in of the timbers. The break is now nearly repaired. They are working about 25 men at present.

MILL SOLD.—The Plantz quartz-mill at Ophir has been sold to some gentlemen who are moving it to Plumas county.

THE DORRER MINE.—*Nevada City Herald*, July 20: Seven miles from Alta, on the north fork of the American river, in Placer county, there has been some extensive prospecting done for the past 5 or 6 years on the ledge known as the Dorrier. The owners are Wm. Sexton, Geo. D. Dornin, M. M. Drew, H. D. Chase and W. L. McEwen. Last fall work was commenced putting in a dam for water-power and the erection of a 10-stamp mill, which was all completed about the middle of April. The ledge is in a slate formation and is a north and south vein. It runs from two to 20 feet in width. The ledge runs up a mountain from the river and the upper portion of the claim is 2000 feet above the river level. The opening where ore is now being taken is 3000 feet from the river, at an elevation of 1400 feet. From this point the rock is transported to the mill, which is on the river, on a tramway 3100 feet long. One tunnel is in 210 feet and another is 100 feet, and still another 50 feet. Rock for milling purposes is being taken from all these tunnels. The mill is run by free water-power. The rock is low grade, running from \$3 to \$7 per ton. The gold is very fine quality, being worth \$17.50 an ounce. The size of the ledge, its near proximity to free water, and the fact that fully 2000 feet of backs can be worked by tunnel, make this a very promising property.

San Diego.

JULIAN.—*Julian Sentinel*, July 20: The High Peak mine has been located by Messrs. J. Marks, Duncan Ferguson, H. Garland and S. L. Ferguson, and the work of opening up the old tunnel will be commenced next week. It is a noticeable fact that of all the mines which have been opened around Julian, there is but little quartz lying on the dumps, it all having been milled. This is a good sign, and shows that what rock was taken out was paying. Joe Marks went out Wednesday forenoon and surveyed a new mining claim located by a stock company composed of Charles Hale, S. L. Ferguson, Joseph Decker and Joseph Marks. The quartz now on exhibition contains copper, iron, gold and silver.

Sierra.

MOUNTAIN.—*Tribune*, July 20: Fifteen men are employed at the Mountain mine under the foremanship of Wm. Jenkins. No. 2 tunnel is being pushed ahead, but it will take some months yet before the ledge is reached in that quarter. In what is termed Harry Warner tunnel, work is also progressing. The ledge opened up in this tunnel is from 12 to 15 feet wide and yields big prospects in free gold.

NEW TUNNEL.—The new tunnel at the Sacred Mount mine is in about 70 feet. It is expected that the ledge will be reached within two weeks.

YOUNG AMERICA.—*Mountain Messenger*, July 21: Forty stamps are steadily running at the Young America quartz mine, and 125 men employed. There are four boarding-houses for the miners. Under the able direction of Stephen A. Moore the work progresses favorably.

NEW COMPANY.—A company has been formed to develop the gravel claims on Humbug creek, near

Indian valley, owned by Jerry Watts. They have been bonded for four months, and meantime will be thoroughly prospected. At the expiration of the bond the parties interested have the privilege of taking all or a certain portion of the ground. Work will be commenced next week.

Shasta.

GOOD GOLD ORE.—*Shasta Courier*, July 21: Frank Panter, of the firm of Garreth, Panter & Yung, owners of the Mammoth mine in Old Digging district, went to Selby's Reduction Works last week with two carloads of ore. The selected ore went \$107.83 to the ton, nearly all gold, and the unassorted went over \$100 to the ton. The boys have 1000 tons of quartz on the dump, just as rich as that sent down, and any quantity more in sight in the mine. As they are not practical millmen, we understand that they would be willing to sell their ore at the dump or have it worked on shares by a competent and reliable operator.

POCKETS.—Several pockets of free gold have recently been struck on Rock creek, and miners who have "walked right over them" for years are disgusted. It takes diggin' to find "pockets," and then when they are found, oftentimes there is not enough in them to pay for a week's grub and a plug of smoking tobacco.

Siskiyou.

MINE-OWNERS.—*Yreka Journal*, July 21: Our mines are the main prop of Siskiyou county, and those of our citizens who are engaged in mining are entitled to much credit for the good they are doing. Probably the heaviest mine-owner in the county is George Smith of Etna, who has been at the head of nearly every large mining enterprise in Scott valley and on Salmon river that has been inaugurated during the past few years. To him and such enterprising men as Hon. R. H. Campbell, Ball & Co., Wright & Fletcher, Eastlick Bros., Hon. John Daggett and many others, Scott valley owes a part of its present prosperity.

CHROME.—*Yreka Journal*, July 21: A superior quality of chrome ore has been found in the Forest House mountain, six miles south of Yreka, but no regular ledge.

CRUSHING.—The old Warren quartz-mill is now in running order, and commenced Monday in crushing quartz hauled there from the ledge of Mills & Co. at Humbug gulch. Other parties have considerable quartz on hand for crushing, as their turn comes. A four-foot quartz ledge has been found at the Shasta county line on railroad, by W. J. Root and others, which contains considerable silver and some gold. The last cleanup of the Mountain Laurel quartz mine, at Salmon river, realized \$30 a ton. The Black Bear mine at Salmon river looks well at present, and will no doubt pay well at next cleanup from present crushing. Radefinger & Co. have a fine three-foot ledge at Know Nothing creek, which pays rich, and Hensen & Co. and Clark & Co. also have rich ledges on the same creek. York & Ball, of Methodist creek, have a rich ledge containing both silver and gold, and there are several other companies at work on Know Nothing and Methodist creeks, all doing well.

Trinity.

EAST FORK.—*Journal*, July 21: Capt. C. P. Weaver informs us that the mill which is in process of construction on the Golden Chest mine, at East Fork, will be completed about the first of September. If satisfactory arrangements can be agreed upon in reference to some of their mines by that time, work will be pushed and ore crushed as rapidly as possible; if such arrangements are not made, development work will be done on some of the locations that the company has, until such time as an agreement is reached. This company is doing much for the camp of East Fork.

RUNNING A TUNNEL.—Joseph Falan of Deadwood is at present running a tunnel to tap his recently discovered ledge. In 17 days he run 100 feet, and about 150 or 200 feet more will have to be run before the ledge will be tapped. Mr. Falan says the ore prospects well and he has a great deal of faith that it will prove to be a good mine. It is farther south than any that has been discovered about the old Vermont mine and is thought to be an extension of the Montezuma ledge, recently purchased by Wm. T. Coleman & Co.

Tuolumne.

MEN AT WORK.—*Tuolumne Independent*, July 20: Hayward & Hobart have placed a force of men at work on the Eureka Consolidated, near Summersville, intending to get everything in readiness for working the property on a large scale. This mine is ranked by experts as one of the best in the county, and should the venture prove a financial success, it will be a God-send to those holding mines in that district, and a help to the county in general.

HOISTING WORKS.—The new hoisting works on the Black Oak of Soulsville have just been completed, and part of the mile of pipe has been laid. The company expects to soon have the new machinery going.

Ventura.

SILVER ORE.—*Ventura Democrat*, July 19: Chas. Ostrom brought some specimens of silver ore to this office during the week, which were taken from a location he has just made in the vicinity of Frazier mountain, that contained a fair amount of silver. Mr. Ostrom has made a location on the ledge which he will begin prospecting in a few weeks, and hopes to develop a valuable mine.

NEVADA.

Washoe District.

BEST & BELCHER.—*Virginia Enterprise*, July 21: El Dorado level: The main northwest drift from the main west drift has been extended 58 feet; total length, 468 feet. The formation is clay and porphyry.

CON. CAL. VIRGINIA.—The upraise from the 1500 level is in low-grade quartz. The north drift from the north stopes on the 1500 level is in vein porphyry that shows bunches of good ore. A south drift from the Ophir east crosscut on the 1500 level is now in Con. Cal. & Virginia and is in ore of fair grade. The ore shipped during the past week will show about the usual average assay value a ton. The California mill will start up next week.

OCCIDENTAL.—Upper tunnel: One hundred and fifty feet below the upper tunnel, in the boiler winze, the north drift has been extended 10 feet;

total, 48 feet. The south drift has been extended 8 feet; total, 18 feet. Lower tunnel—Seventy-five feet south of the north incline winze, the incline upraise has been carried up 17 feet; total, 157 feet. One hundred and fifty feet south of the same winze the south drift has been extended 7 feet; total, 130 feet. In the winze leading to the lower level, 50 feet below the lower tunnel, the north drift has been extended 8 feet; total, 31 feet. Extracted 90 tons of ore. Shipped to the Atlanta mill 125 tons ore, the wagon assay value of which was \$27 a ton.

GOULD & CURRY.—El Dorado tunnel: West crosscut No. 2, started from the main southeast drift, has been extended 39 feet; total length, 90 feet. The formation is quartz, giving low assays. The south drift from west crosscut No. 2 has been extended 23 feet; total length, 55 feet. It is still showing milling ore. During the week there have been extracted from the 250 and 300 levels, and shipped to the Douglass mill, 265 tons of ore, the average battery samples of which were \$25.81. Shipped to San Francisco office bullion of the assay value of \$3132.25.

HALE & NORCROSS.—All the stopes throughout the mine are looking very well. No. 1 east crosscut on the 400 level has been advanced 20 feet, making a total length of 45 feet. Good headway is making with the new station on the 500 level. The milling troubles prevent the usual extraction of ore at the present time.

BELCHER.—Work has been resumed through the old shaft by means of the new hoisting machinery. The east crosscut on the 500 level continues in fair vein material. Good headway is making in the connecting drift that is being driven from the Sutor tunnel, though the rock continues very hard.

ENCHEQUER.—On the 122 level the northwest drift is out a distance of 70 feet. The face is in quartz. The east crosscut on the 222 level is out 250 feet, with the face in clay and porphyry. The north lateral drift on the 380 level is out 360 feet. The face is in clay and quartz.

CHOLLAR.—The oorth raise from the 650 level is up 65 feet, and is in fair grade ore. On the 450 level the north drift is out 25 feet. The face is in low-grade quartz. The electric station on the Sutor tunnel level will be completed in three or four days.

POTOSI.—The south drift on the 65 level is out 240 feet. On the 550 level the south drift is out 675 feet. The face is in quartz giving low assays. East crosscut No. 2 on the 550 level is out 90 feet, and the face is in clay and porphyry.

SAVAGE.—The stopes on the north and south drifts on the 400 level are still looking and yielding well. Good ore is also found in the south drift on the 500 level. The low stage of water prevents the usual extraction and shipments of ore.

CROWN POINT.—Good progress is making in the north drift started to cut the ore found in the raise above the 600 level. On the 700 level the east crosscut continues in a mixture of clay and porphyry with some seams of quartz.

SEG. BELCHER.—Paying ore is being found in bunches and feeders in the raise above the 1300 level. The indications are good for finding a large body of paying ore in this part of the mine.

YELLOW JACKET.—The shipment of ore has been discontinued on account of the low stage of water in the Carson river. The usual exploring and development work is being done.

UTAH.—On the 372 level, opposite the south drift, the north drift has been extended 50 feet; total length, 258 feet. This drift continues in a porphyry and quartz formation.

IOWA.—Preparing to open a level from the main shaft on the south side of the mine to explore the vein stripped in the south drift from the McBec tunnel at greater depth.

BALTIMORE.—The prospecting drifts on the 300 level are developing feeders of good ore. The pumps are running well and smoothly. They handle the water very readily.

SIERRA NEVADA.—The west crosscut from the main south drift on the 520 level is out 60 feet. The face is in vein material composed of quartz, clay and porphyry.

WEST YELLOW JACKET.—Good progress is making in the upraise which is to connect in a few days, where it is thought good ore will be found.

ANDES.—The usual prospecting work is being done on the 240 and 350 levels. Some bunches and stringers of fine ore are being found.

UNION CON.—The face of the north drift from west crosscut No. 2 on the 1030 level is still in vein material of a promising character.

WEST CON. VA. & CAL.—The new hoisting plant is working well and good progress is making in sinking the main shaft.

ALTA.—The stamps and concentrators are kept in constant operation. The mill works about 25 tons of quartz a day.

LADY WASHINGTON.—The crosscuts from the raise above the 725 level are in quartz carrying some metal.

BULLION.—Good headway is making in the main south drift from the bottom of the winze on the 640 level.

MEXICAN.—East crosscut No. 1 from the main north drift on the 1300 level is still in vein porphyry.

BENTON.—The only work being done is on the 725 level, where some prospecting is in progress.

ALPHA.—The main shaft has been sunk and timbered to a point 90 feet below the 380 level.

SCORPION.—The south drift on the 400 level is out 378 feet. The face is in vein porphyry.

OPHIR.—Upraise No. 2 on the 1465 level is in a mixture of quartz and porphyry.

IMPERIAL CON.—The south drift on the 1100 level is being reopened and repaired.

Eureka District.

COPPER.—*Eureka Sentinel*, July 21: The owners of the Silver Connor mine, on Prospect mountain, shipped to Salt Lake during the week trial samples of one ton of copper ore, and ten tons of iron gangue gold ore, the results from which we will furnish to our readers as soon as they are received. From 350 to 390 cars of material are handled during 12 hours of the day at the Eureka Con. slag dump by means of the new hoist, and in order to push work, with greater dispatch, hoisting in the future will be continued during the night. A shed has been built over

the engine. We learn that the Silver Lick mine on Adams Hill never looked so well as it does at present. The tributaries have lots of ore, and from reliable sources we hear that a great deal of it is very rich.

Jefferson District.

LEACHING.—Belmont *Courier*, July 21: The Kanrohat mill and leaching works at Jefferson are running nicely and producing bullion. The miners of that district are all busy developing their claims and extracting rich ore.

San Antonio District.

PRODUCING.—Belmont *Courier*, July 21: The New Year mine is producing its usual amount of good ore.

Tuscarora District.

BELLE ISLE.—*Times-Review*, July 21: The usual amount of ore has been taken from the stopes.

NEVADA QUEEN.—The south drift from the 150-foot level of Commonwealth has advanced 15 feet in very hard rock. A joint upraise has been started near the line and extended up 12 feet, exposing fine ore all the way. The 350-foot stopes have been extended both north and south. North, the ore continues and looks well; an upraise has been put up 18 feet at the extreme north end of the stopes, in which an ore chute will be made. South end stopes are within a few feet of North Belle Isle line, the ore being high grade; in fact, all the stopes look as well as at any time heretofore. The south intermediate, 90 feet below the 200 foot level, is following the ore, which is very high grade. The 450-foot level is being opened up through the North Belle Isle, they having driven their drift to the line, where it was turned over to the Queen. The ore is very high grade, carrying 33 per cent gold. Seventy tons sent to the North Belle Isle ore-house average assay from car samples, \$210.31 per ton; 279 tons of concentrating ore hoisted to the surface, average assay from car samples, \$25.59 per ton.

COMMONWEALTH.—100-foot level: A drift was started and run 15 feet north from No. 1 east crosscut, following the ore, which is two feet wide in the face, assaying from \$40 to \$55 per ton. This drift has been stopped, and a drift south started on ore, to connect with the upraise from south drift 150-foot level. This raise is near the line and has been extended up 12 feet, exposing very fine ore all the way. A prospect shaft has been started on the eastern part of the mine and has been sunk 20 feet, following a vein of chloride which has widened out to six feet of low-grade ore. Mill is running all right and doing good work. Average battery assay \$478.98 per ton.

GRAND PRIZE.—West drift, 200-foot level, extended 13 feet. Face showing two feet of good chloride ore. Stopes above the 200-foot level are looking well. The ore is now turning from sulphure to chloride as they ascend and the vein increasing in width. The drifts on this level are now timbered for about 250 feet and stopes started the entire length. Stopes above the 300-foot level are yielding the usual amount of sulphure ore.

NORTH BELLE ISLE.—Good progress has been made with the work at all points. Work on the concentrating plant is under good headway.

FOUND TREASURE.—The usual amount of ore has been taken out and sacked ready for shipment.

Tybo District.

TO START UP.—Belmont *Courier*, July 21: It is expected that the Nye Mining Co.'s mill will soon be started up on ores from the 2G and other mines of the district.

ARIZONA.

NOTES.—Prescott *Courier*, July 19: John Curtin, who is tunneling in the Lion lode for Mr. Leavick, has bored into it about 100 feet, and speaks encouragingly of the vein. It is of good size and quite rich. Col. Bean is better satisfied with Copper Basin than ever before. Ledges are growing in size and richness. Mr. Williams, the superintendent, is also in a pleased mood. Two routes for a narrow-gauge railroad have been examined. The shortest is 15 miles. Miners from Tipton are here with ore and say they can do better by bringing ore here than by shipping it south. Mr. Van Name of Big Bug was here yesterday. He said his mill is doing first rate. The Tuscumba and Del Pasco mills are running regularly. Messrs. Cockburn & Jungk are en route to Eureka district, where a smelter may, ere long, be put up and run. Van Name's mill is making a successful run on gold rock. Another smelter will soon be running out copper at Jerome.

ORE SHIPMENTS.—Prescott *Courier*, July 9: Aleck Thompson, whose teams have been hauling ore to the Etta mill, has arrived here. Aleck thinks he can make more money hauling machinery for Mr. White, of the Boaz mining company. He says he left the Etta running nicely. Four of Shull & Austin's big teams came in Saturday last from the Congress mine, with ore which will be shipped by the Arizona Ore Co. Same teams will take machinery to the mine. C. Douglas Brown has a contract for erection of the Senator mill. Machinery is at the depot. Capt. Brann is running the Wonder mill in Turkey creek district, on gold ore, which, it is said, pays pretty well. A check for \$15,282.15 was recently paid one individual, for ore, by the Arizona Ore Co. of this place. Joe Chambers, who is taking out ore in Big Bug district, will have it worked in Van Name's mill.

COLORADO.

NEW DISCOVERY.—Elk Mt. *Pilot*, July 20: A new discovery was made a few days ago in the Rainbow lode, situated on East Brush creek, and Mr. Robie, the owner, is very happy over it. The tunnel was driven through very hard quartz, when all of a sudden the drill struck into a soft, decomposed matter, and on examination by those who claim to know, the decomposed matter is sand carbonates. Other mine-owners in the vicinity have courage and prospects on Brush creek are very hopeful. Messrs. Wyckoff and Frost are very much pleased with the developments on one of their Brush creek properties. They were driving the tunnel on the footwall on a very fair streak of mineral, when Mr. Wyckoff took a notion to crosscut for the hanging-wall. He started to follow a small crevice which eventually led to the hanging-wall and also disclosed a pay streak of mineral, that is evidently the main pay streak. Returns have been received on the carload

of Sylvanite ore shipped to Pueblo, which netted here \$2500. While that is pretty good and certainly rich ore, it was not up to what was expected from the Sylvanite. Other shipments will be made at once, and all concerned will soon be considerably relieved. Supt. Murphy has a force of 19 men employed at present, and is doing some good work. There will soon be quite a large ore traffic from the breaker when the Augusta gets to shipping and what ore comes from the Daisy is loaded there. This mine loads three cars this week.

DAKOTA.

CASTLE CREEK.—Deadwood *Pioneer*, July 15: Encouraging news has come from the Castle creek mining camps the past week, the reliability of which cannot be questioned and which must surely stimulate mining in that part of the hills to a great degree. Mention was made of the new strike in the Castle Creek, and of the excellent condition and prospects of the Lookout. The amount of work done by the present management of the Lookout to get it in working order is considerable, amounting in round figures to nearly \$5000. The tramway was badly out of repairs, and had to be reconstructed and rendered safe, and the flume required considerable repairs also before it would carry the water satisfactorily. There is no better flume or tramway in the Black Hills now, probably, than those of the Lookout. One of the chief difficulties in the way of the successful treatment and saving of the ore of this mine is the presence of plumbago in many of its ore bodies. The bodies of ore in which this substance is found are the richest in the entire property; several large tunnels have been opened up in all of which plumbago is found in large quantities, and being of a black, greasy nature, is difficult to separate from the gold. The former company found it almost impossible to work this ore, but Prof. G. E. Bailey, who is connected with the present company, has discovered a plan whereby the plumbago may be successfully separated from the ore at very little cost. He is now preparing plans of the additional machinery to be presented to the company for their approval. There is little doubt that the plans will be adopted. If this substance can be moved with little cost, ore assaying from \$5 to \$6 per ton can be found in unlimited bodies almost, all of which can be worked.

IDAHO.

SILVER MOUNTAIN.—Idaho *City World*, July 18: The Julia and Cleveland mines being developed by the Silver Mountain Mining Co. now loom up grander than ever before. All old quartz miners who have visited these locations give the same accounts of the ore bodies as to the quality and quantity, and all predict that Silver Mountain district will prove to be one of the greatest quartz camps in North America, and their predictions are backed by mountains of quartz, the croppings of which make July as good a showing as did the croppings of the Julia and Cleveland. The coming fall, the mill, one of the finest in the Territory, will be making music in a section that a little over a year ago was a silent, solemn wilderness. A tramway, over a mile in length, will carry the ore to the mill. They have 13 locations, and two of them have been sufficiently developed to prove that they are mines of great value.

ANOTHER MILL TO BE STARTED.—Wood River *Times*, July 18: Superintendent Bailey, of the Champion Mill and Mining Company, was in town to-day. He stated that his mill would commence crushing between the 1st and 10th of August. He says that he has solved the water question and that he has now more water at his mines than there is in Camp creek, which is dry.

MONTANA.

AROUND BUTTE.—*Miner*, July 18: Operation have again been suspended on the Amy & Silversmith. The new amalgamating pans that have been placed at the Silver Bow mill will be ready to start Monday morning. Drifting is in progress on the ledge at the 250-foot level of the Hope with a very fine showing. The hoisting of ore on the Anselmo will be resumed in a few days, as a large body of first-class ore is known to exist there. The ore of Butte shaft is sunk to 100 feet and sinking still continues. A crosscut was run in on the 100-foot level before going any deeper and a strong body of ore developed that encouraged further progress. The masonry work on the foundation for the Frazer & Chalmers engine at the Goldsmith mine has been commenced. Crosscutting has begun at the 200-foot level of the Volunteer. This is one of the most promising prospects in the camp. The Mountain View mine is producing its regular quantity of ore. The Parrot is at present down 700 feet, producing its regular quantity of ore to supply the second largest smelter in the Territory, which, besides, does much custom work. One of the largest shafts being sunk in this district is that on the Green Mountain, situated midway between the Mountain Consolidated and Wake-Up Jim. At present it has attained a depth of 200 feet. Three eight-hour shifts of eight men each are at work on it. When the shaft has been sunk to the required depth the largest pump in the camp will be erected, as well as the largest hoisting works in Montana, which will be capable of hoisting all the ore from the Mountain Consolidated, Wake-Up Jim and Green Mountain.

BEARMOUTH DISTRICT.—Phillipsburg *Mail*, July 21: James Early of Bearmouth arrived in the Burg Tuesday evening. He reports plenty of water so far in the placer-mining regions of this section, and that work has been going on uninterruptedly during the entire spring and summer and that it will probably continue for some time to come. People owning quartz ground are beginning to awaken.

HATTA.—Louis J. Hendrikson states that reports received at New Chicago from several of the mining men in from Dunkleberg district, announce that things are looking exceedingly well at the Hatta mine. The contractors at work sinking the shaft have come across some excellent ore.

BLACK PINE.—The mine of the Butcher Bros. in this district is proving to be quite a valuable property. A recent strike is reported as having been made, in which some very valuable ore has been encountered, the mine looking better at present than it ever has.

SAN FRANCISCO.—Operations still continue in this mine and the indications are still as favorable

as it is possible for anything of the kind to be. The ore that has been shipped and is still on hand to be shipped is of a very rich character.

AT YOGO.—*Inter-Mountain*, July 21: T. E. Collins informs the Great Falls *Tribune* that he has made arrangements for putting in a small mill to work the ores of the Golden Chariot and other gold-bearing leads owned by him in Yogo. Mr. Gardner of Maiden puts in the mill and will operate it. He can put through eight to ten tons of ore a day and clean up monthly a nice lot of the "shining metal." This will be an important acquisition for Yogo and will help to bring that camp to the front.

THE CASTLE SMELTER.—The construction of the smelter is rapidly going forward under the push and energy of the superintendent, Mr. King. The frame was raised last Friday and the building is nearly inclosed.

AT SUNSET PEAK.—On the Custer lode, near Sunset Peak, the Porter brothers struck a ledge four feet wide in their tunnel. The ore assays \$200 per ton.

NEW MEXICO.

MOUNTAIN KEY.—Silver *City Sentinel*, July 21: The Mountain Key Co. is now working two full shifts—night and day—and has re-employed a large force of men. Bell & Stephens made a run of 674 tons of Mountain Key ore and got 134 ounces of gold off the plates; the yield of the concentrates was between \$6000 and \$7000. The company is said to be in need of men. Air connections have been made in the Mountain Key mine. The ventilation is now perfect, and the working force of nine men increased to the full capacity of the mine. N. Bell, while in St. Louis, sold the Pacific No. 2 for \$75,000, part in cash and part in stock. During the short time Mr. Bell has had possession of this property he took out 471 tons which ran \$14,231.16; the cost of taking out was \$5608.15, leaving a net profit of \$8623. Large quantities of fine ore have been struck in various places in the Central City camp, but the great difficulty encountered has been from water, which usually appears at the 50-foot level. The locators are, as a general thing, poor men, and are not able to purchase the necessary machinery to keep the water out of the shaft and drifts. When capital is induced to invest in this camp, as it will be shortly, the Central City district will become one of the most flourishing in the Southwest. The recent discovery of extensive deposits of carbonates of lead in the Big Hatchet mountains in the extreme southwestern portion of the county is an event of great importance to Silver City and the country at large. The geological conditions are quite as favorable for large deposits as those surrounding Leadville, and it may be confidently expected that the developments now being made will prove the locations to be of more than ordinary value. A new mining district is among the latest of the late finds for the week. The discovery is lead in carbonate form of sufficient width and value to justify three of Leadville's old and well-known miners to open up and thoroughly explore the new district, which is located in the Diavolo range of mountains, north and east of Pinos Altos.

COPPER PLANT.—Silver *City Enterprise*, July 20: C. C. Fitzgerald of El Paso has organized a St. Louis company of \$500,000 capital to operate the International smelter at El Paso. A copper plant has been ordered. The Gipsy Queen mill of Shakespear district was sold last week by Sheriff Laird for \$873, the amount of the judgment and costs. C. H. Wilkie has finished moving one of the Bremen hoists to the Wagner mine of the same group, where it is now in running order. Milton Miller came in yesterday from the Alhambra, where they have made another strike of 15 inches of rich sulphides and native silver, equal to the lot first taken to El Paso. It will run over \$100 to the ton. The Thunderbolt prospect at Pinos Altos is showing up finely, although down only a few feet. The claim belonged to the Carter boys, but is being developed by St. Louis capital. The contract on the Golden Giant, the old Gopher mine at Pinos Altos, will be finished in a day or two. A mill run to be made, 150 tons being on the dump, and the owners expect to soon be working 30 or 40 miners. Since the last issue of the *Enterprise* two bricks have been shipped by Captain Cooney of Silver Creek, in the Mogollons, weighing respectively 26 and 30 pounds. The bullion contains quite a per cent of gold, which makes the bricks worth more than ordinary silver bullion. Captain Cooney has been short of water until the last week, but now has an abundance and will keep his 5-stamp mill running steadily from now. His mill is turning out about \$8000 per month at the present rate of shipment. Something over three miles of the workings of the Santa Rita copper mines have been cleared of water, leaving about ten miles of water still in the mines. It was estimated that the mines could be cleared of water in about two months and a half, but the pumps have not been working satisfactorily, hence more time will be required. Some of the timbering in the mine is in bad condition, which will be replaced by new timber now being sawed at the company's mill. As yet it is not known here when the company will resume operations, but it is probable that it will be very soon after the mines are cleared of water.

RELIEF HILL.—North San Juan *Times*, July 20: Relief Hill, 3 miles east of North Bloomfield, has seen flourishing days in its time and it is by no means dead yet. Formerly, before Judge Sawyer assumed the robe and scepter, the hill gave employment to 100 men; at present about one-quarter that number are working there. Among the drift claims (old hydraulic diggings) now in operation is the Eureka, which has yielded largely for 15 years and is at present producing satisfactorily. It is operated by Jepson Brothers. The Union is another gravel mine at Relief and its operation dates back 30 years. Messrs. Jepson, Morgan, Jerkinson, Rossan and Beck are of its shareholders. They hire several men. The Eureka Lake Co. also owns claims at the Hill, the Eagle being one of them. A good deal of work has been and is now being done on the Wakeshaw, in which are interested five gentlemen bearing the name Williams and three who answer to "Mr. Jones." These eight men are working partners, and are running a prospect tunnel at present. They expect to strike the channel some time now, as the bedrock in the tunnel is pitching steadily. The Wakeshaw workings are further in than has as yet been mined in this claim, and good ground is looked for shortly.

The Blue Lead is located north of the Wakeshaw, has a prospect tunnel in 2000 feet, and its workers hourly anticipate striking it big. In the vicinity of the Hill is a gravel claim known as the Bonanza. It was originally taken hold of by a company of 28. Two years ago the property was sold for taxes and was bought in by D. R. McKillican of North Bloomfield. T. P. Crandall also became an owner in it. These gentlemen commenced a still hunt for suitable parties with whom to associate themselves and form a company, in the meantime keeping up the assessment work so as to prevent their claim being jumped. The Derbec channel pitches toward the Bonanza's ground, and the owners of the latter are correspondingly elated. At present these owners comprise Messrs. D. R. McKillican, T. P. Crandall, John M. Williams, A. J. Ross, William Davis (foreman at the Derbec), Richard K. Jones, Thomas Harris of North San Juan, John Jones, D. Williams and Mrs. Hickman of Relief Hill. The Bonanza Co. has expended considerable money in surveying, etc., and but little opening-up work has as yet been done. It is the wish of the Bonanza's owners to deed half their ground to a party of men who will for that compensation develop the property.

OREGON.

GRANITE DISTRICT.—Bedrock *Democrat*, July 16: The Democrat office yesterday received a pleasant call from Mr. J. E. Sharp, an ex-newspaper man, and now owner of valuable mining properties in the Granite creek district. Mr. Sharp gives an interesting account of mining operations in his section, and tells us what has been done in the way of development work on the Golden Monarch mine, owned by himself and Wm. Graham. The Golden Monarch mine is about 20 miles southwest of Cracker creek in one of the best mineral districts in Oregon, surrounded with abundance of timber and water, and everything available for its successful working. Messrs. Graham & Sharp have been doing development work on the Golden Monarch for the past two years and have run a crosscut 160 feet in length, tapping the ledge, which is about four feet in width, at a depth of 125 feet, and run a level from that of 140 feet in length. On the middle of the ledge a surface tunnel has been run, tapping the ledge 40 feet deep. They are taking out ore and running it through an arastra, which averages, per 100 tons, over \$10 per ton. Adjoining the Golden Monarch is the Red Boy, owned by Graham, Hanlon & Mansfield, the ore of which is being worked by arastra, averaging \$20 per ton. Mr. Sharp has great hopes for the future of the mines of Granite creek and is content to await their development.

UTAH.

REVIEW.—Salt Lake *Tribune*, July 20: The week closes with the dolorous announcement of the shutting down of the Germania smelter, and the prospect of the other smelters in this valley following suit presently. The relief of \$3 a ton on railroad rats (which did not come till the day of the Germania shut-down) will probably have no effect on the question, as the rate is still higher on bullion than on ore, and ores from abroad are given better rates proportionately if they are sent beyond Salt Lake than if they are stopped here. The Germania shut-down will be a heavy blow to the business and industrial activity of this valley; if the others also shut down, as now talked, it will rise to the dignity of a calamity. Better railroad rates would give some relief; but the causes that operate against us lie even deeper, and a change in the rule of customs as to imports of lead ores is also essential to our prosperity. The receipts in this city for the week ending July 18th, inclusive, were to the value of \$99,993.26 in aggregate, of which \$75,585.11 was in bullion and \$24,408.15 was in ore. For the previous week the receipts were \$96,403.31 in bullion and \$37,245.67 in ore, a total of \$133,648.98. The product of the Ontario for the week was \$17,914.96 from ore sales, and of bullion 20,371.93 fine ounces, an approximate total of \$38,786.89. The Daily output for the week was of bullion, 10,957.47 fine ounces; no ore sales. During the week the Daly has declared dividend No. 17, of 25c. per share, payable July 30th. Receipts of bullion in this city for the week were valued at \$29,933.11; fine bars, \$30,152.02. The Hanauer smelter produced for the week \$175,500 in bullion. There are rumors that the Horn Silver smelter contemplates a resumption of sinking 400 feet lower, but the reticence of the management prevents a ratification of the rumor, which is not at all probable in view of the condition of affairs in the mining world. Ore receipts in this city for the week were to the value of \$11,450 by Wells, Fargo & Co.; \$11,600 by McCormick & Co., including \$1900 Queen of the Hills; and \$1353.15 by T. R. Jones & Co.

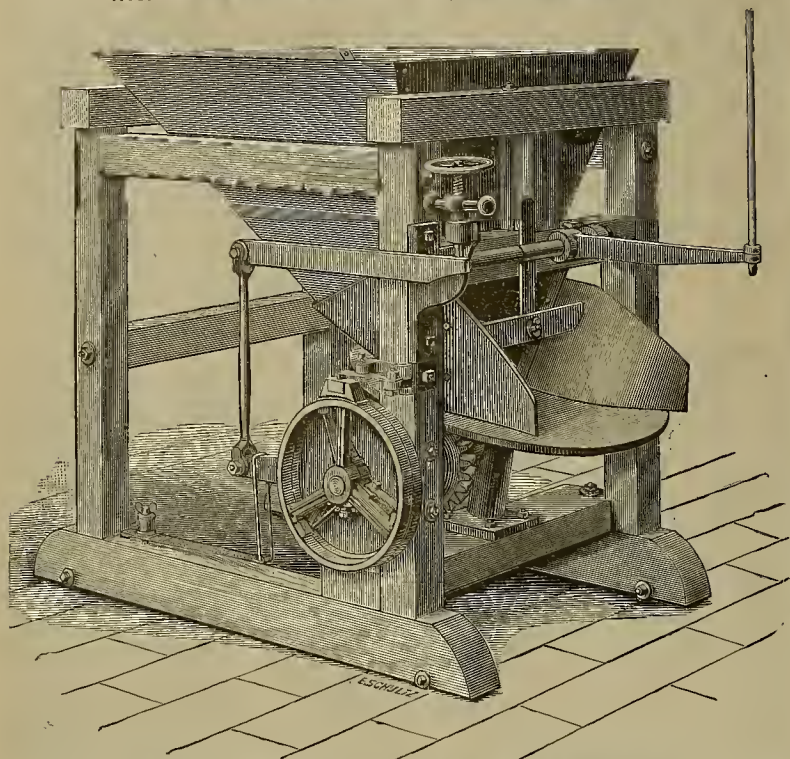
WASHINGTON.

THE IRON DEVELOPMENTS.—Ellensburg *Capital*, July 18: The Moss Bay Co., after examining the developments made in their iron mines in the Upper Cle-Elum district, concluded to prosecute work more vigorously, and this week have doubled their force. The mines are showing up better than was anticipated and the ledges wider, and the iron improves with depth. This is very encouraging to the owners and insures the establishment of the extensive steel works in Kittitas county at no distant day. The fact of continued development on a more extensive scale and the existence of the contract between the Northern Pacific and the Moss Bay Co., indicate that the works will be built in this county along the line of the Northern.

SEEKING MINES.—During the past few days, Ellensburg has been visited by several prominent mining men from Montana and Idaho, who came for the purpose of investigating the mineral resources of Kittitas county and the Concoquilly and Okanogan country. They are men of experience and means and have made their money by the development of mines and the working of ores in their respective Territories, and are willing to invest in mining properties in this section of the Northwest, providing they can find what they are seeking. The developments thus far made give promise of great results, but lack of capital has prevented the prospectors and early owners of the mines from opening them up on a scale commensurate with their promise and worth. As rich and extensive deposits of gold, silver, copper and lead have been discovered in America are here awaiting capital.

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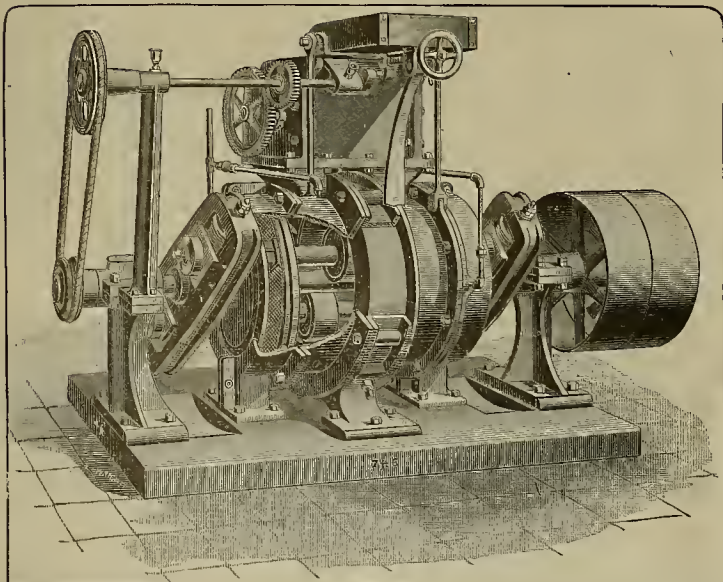
N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.
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And renewals will not cost over one-half as much as for stamps. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh.

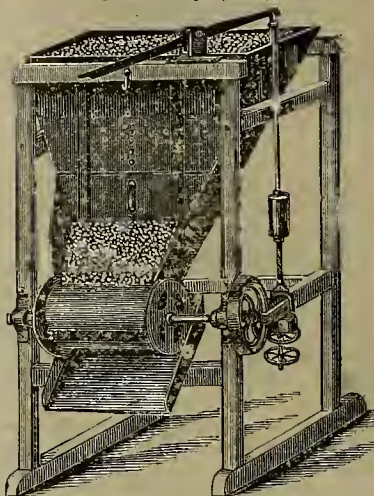
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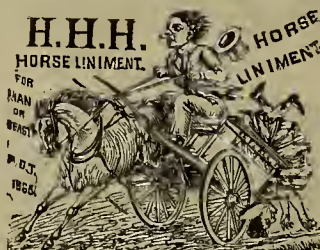
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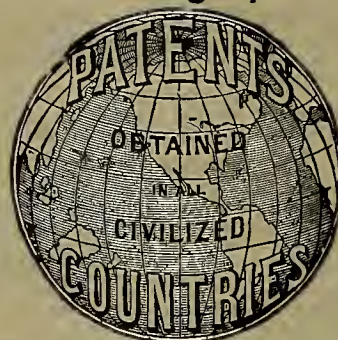
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San Bernardino County Mines.

Exchequer Mining District.

EDITORS PRESS:—As you received no answer to my communication in your edition of May 12th, I will now answer it myself.

The owners of the claim in question, in which the vein at 60 feet deep was apparently cut off by a perpendicular wall of porphyry, as illustrated so clearly in the cut on page 297, concluded to put in a few thousand dollars and go through the porphyry dyke which they supposed was as wide at the point 60 feet below the surface as it appeared to be on the surface, when, to their surprise, two shots broke through the porphyry and revealed to them a continuation of the vein in all its former size, and containing much better ore than where it was cut by the porphyry. The porphyry was only four feet thick, and the owners of this property called the Cashier mine had only a few feet farther to go, when the vein formation widened out to 16 feet from foot to hanging wall.

The key to the whole district has now been discovered, the incline A on diagram (May 12th) has been extended and sunk about 40 feet, and has cut through ore going as high as \$2000 per ton. The amount of the ore body or pay streak cannot be determined, owing to the immense size of the vein. The incline has been sunk on the hanging-wall 5½ and 4½ feet wide in ore.

The owners have just let a contract to Messrs. Batchelder & Janzen for 60 feet of a shaft or incline 5½x4½, cut through from the hanging-wall. Nothing is known about the footwall which was left ten feet under the shaft, but at the expiration of this contract they propose to make a crosscut to the footwall. As they are men of limited means, they could not afford to take out the entire 16 feet of the vein formation. Every one rejoices in their good fortune in having found the vein on the other side of the porphyry. Experts and experienced miners gave it as their opinion that the ledge had faulted, perhaps, several hundred feet.

The camp was discovered in 1883, and some hundred or two of claims were located, and several carloads of ore were shipped by chlorides. Great excitement prevailed and every one supposed they had made a big strike, and so it appeared from assays obtained, which ran up into the thousands, and returns from chlorides corresponded with assays. All at once they ran against porphyry dykes, or so they appeared to be, when really they were nothing but the shrinkage of the veins, having contracted and the space filled in with porphyry, as has been discovered in exploring the Cashier.

But one by one the chlorides and owners of the location became discouraged and abandoned their claims, which were located by Spawforth & Spencer, with the exception of one or two parties, whom they had bought out previous to commencing work. They are now the owners of some 40 claims, which prospect on the croppings remarkably rich, and should they be found on the other side of the porphyry as was the Cashier, they have a valuable lot of mining property, which ought to make them millionaires, which they truly deserve to be for the pluck and energy they have displayed, at a time when the district was condemned by every one, far and near; and they had given the district such a black eye, so to speak, that they could not induce any one to help them in what appeared to be a gigantic task, i. e., the solving of the porphyry dyke problem; and every one supposed they would never find the vein again, or if at all, at such depth as to cost more than it would be worth, when only two charges of giant powder, a cap or two, and a few feet of fuse, unlocked the mystery. Now they are going down nearly 100 feet, the vein getting better all the time. But development work is expensive, particularly as you go deeper. They are ambitious to see what the vein is at 400 or 500 feet. Several parties have been to see the strike, and the owners can well afford to share with one or two more partners bringing capital into the concern. They will then have enough, and if only one-quarter of the locations prove good, one-quarter's interest ought to give them a good bank account.

I will drop you a line once a week from here, which you can place under the head of "Mining Summary," as we have no paper here, or in this vicinity nearer than 100 miles. I will make the heading as follows, until your readers know us: "Exchequer Mining District, San Bernardino County."

The following notes explain the condition of affairs in the camp at present: The Cashier is looking well and sinking is progressing very favorably. Batchelder & Janzen have completed ten feet of their contract, and are in very high-grade ore, extending the full size of the shaft. Soft ore is coming in at the bottom of incline and sinking will proceed much more rapidly, which is greatly to the benefit of the contractors as well as owners. The ore is remarkably heavy, being heavily impregnated with iron and copper; the heavier the ore, the richer in gold and silver. Assays often give from 1 to 3½ ounces gold to the ton, besides the silver. I saw one head weighed when I was over to their camp (an average of one foot of ore) which kicked the beam at 508 ounces silver. I did not learn how much gold it contained. A singular feature of the Cashier is the porphyry walls coming in at distances of ten feet. The first extends from the surface down to the footwall; the second did not extend above the

hanging-wall, but formed an arch extending from the hanging down most probably to the footwall, which cannot at present be determined. But what is more important than anything else, the vein gets better after going through these porphyry walls. If they should be a characteristic feature of the mine, and the same rule hold good, a few more porphyry walls will make the owners a mine without going very deep.

The entire mineral belt which extends about three miles east and west and about the same distance north and south, is split up in an easterly and westerly direction with these porphyry dykes or veins, and wherever a vein cuts through them it seems to be highly fertilized. The strike of the Cashier is due east and west, dipping to the north at an angle of about 45 degrees. The entire width of the formation or network of veins is about 100 feet. The owners expect to find the ledge dipping almost vertical at the end of the 60-foot contract, when they look for the entire 16 foot vein to be filled with ore. Crosscutting will then be commenced to tap the other three parallel veins in the hill which resembles a blow-out of ore, and may result in their finding an immense chimney. The most experienced miners are very favorably impressed with an east and west vein dipping to the north; this being a granite formation with porphyry dykes, seems to warrant the belief that they will go down to a great depth.

In the Laurentian systems of the older rocks, viz., granites, the east and west veins have never been bottomed by engineering skill. It is supposed, when the minerals were in an elementary state, that the magnetic currents passing from the Antarctic to the Arctic, when they met a vein with an east and west strike dipping to the north, it acted like a dam on the water and the magnetic currents were deflected downward to unfathomable depths; and although they did not pay as well on the top, the deeper they went the richer they became. On the contrary, a vein dipping to the south is almost always richer on the surface, but becomes poorer as it goes down, the magnetic current being deflected to the surface, leaving it in a state of barrenness.

Two openings are being made on the Cashier at distances of 100 feet apart from which very rich ore is being taken and would seem to indicate that there must be an ore chimney of great size and wonderfully rich at some point between the three inclines. Ore has been picked up on both sides of the Cashier hill on the surface very rich. One piece assayed 740 ounces silver, another a houlder of 25 pounds went 421 ounces silver and one ounce gold; another, 299; another, 378 ounces silver and 2½ ounces gold, indications which gave courage and heart to them to put in their money after repeated attempts on their part to give away one-third of the property to any one to come in and lend them a helping hand, and share with them. Then, becoming discouraged in trying to give away a fortune to some one, they concluded to go it alone.

PROSPECTOR.

Angels, Calaveras County.

EDITORS PRESS:—"Angels is to day the best mining town in the State," that is the verdict of the best mining men and they are backing their opinion with the coin. Messrs. Hayward & Hobart realize the staying qualities of the mines and have invested largely at big figures. That they have "come to stay" is evidenced by their fitting up a residence, and if reports are true a large company store will soon follow. The McCreight mine, on a basis of \$100,000, was their latest purchase. This mine lies south of Angels in Albany Flat. The ores in the last half month run by the former owners averaged \$165 a ton in free gold, with a 15-foot vein to mine from. An English syndicate has purchased of Mr. Stevenot of Carson Hill the group of mines extending from Albany Flat to the Stanislaus river, and will soon go to work on them. This group is probably the largest stretch of mining property in the State all on the mother lode.

In Angels proper the quartz-mills and hoisting works of the numerous mines greet the eye in every direction. With a depth of over 400 feet and an average of 25 feet in width on the veins, the owners feel more than secure in their possessions. Calaveras Co. offers every inducement to mining capitalists—good mines, cheap labor, water for milling, an abundance of timber, cheap transportation, and a climate that permits the working of the mines every day in the year.

At Murphys the Moss and Stone mines have passed into possession of the Oro Plata Co., and hoisting works are now being erected. This is one of the most promising group of mines in the county, and cannot but prove a bonanza to the fortunate purchasers. Conliffe & Driver are sinking on their 16 foot ledge, and when down 150 feet will crosscut. Sublette & Cutting are getting their pocket mine into shape for working. Heinsdorff & Dussell are putting in a Barantini ore-crusher on their 18-foot ledge. McQuage Bros. have shown up an eight-foot ledge on the White Pine, and the mine is reported sold. At Vallecito work is being pushed on the hoisting and pumping works of the Mitchell gravel mines. Go where you will and a new life has been infused into the mining industries of this section, and the future holds forth every promise of prosperity.

E. H. SCHAEFFLE.

Murphys, Calaveras Co.

An Improved Hydraulic Step.

Prof. Frederick G. Hesse of the University of California has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved hydraulic step-bearing for shafts. The invention consists essentially in a chambered vessel containing water and encircling the foot of the shaft, and a plate or disk on the shaft rotating freely within the vessel and operating to force the water which is above it centrifugally, whereby a pressure of water is created below it equal to the maximum pressure above. More particularly the invention consists in a vessel containing water and encircling the foot of the shaft, which is guided centrally therein, a disk or plate upon the shaft and within the vessel, said disk or plate having a diameter less than the interior of the diameter of the vessel, whereby an annular space is left between the rim and the inner surface of the vessel; radial blades or flanges formed within the base of the vessel and under the plate or disk, whereby a permanent water pressure is established through the agency of a forced vortex created by the rotation of the shaft and the flanged disk which it carries, which pressure, in acting against the disk on the shaft, is made to balance a portion or the whole of the load.

The object of the invention is to provide a hydraulic step for shafts by means of a permanent water-pressure created by the rotation of the shaft itself. This is not only applicable to shafts placed vertically, but also to shafts placed in other positions—for example, horizontally, as in the case of a propeller shaft, and wherein the shaft is subject to a thrust of any kind. The parts may be compounded by having one or more inter-communicating vessels in the vertical series, through all of which the shaft passes, and having a disk or plate operating in each vessel, whereby the pressure of the water to support the shaft may be increased.

Mining Share Market.

While stocks do not seem to advance any, the hullion product of the Comstock does. The mines up there are being vigorously worked, and are producing more than they have for years.

The fight for the control of Savage resulted in a victory for the old management, under President H. M. Levy, the Borland faction being defeated. The election for trustees resulted in the election of H. M. Levy, A. K. P. Harmon, E. B. Holmes, Archie Borland and Morris Hoeflich, Mr. Borland succeeding W. C. Watson. H. M. Levy was elected president, A. K. P. Harmon vice-president, and E. B. Holmes secretary, with R. P. Keating superintendent.

The yearly report of the secretary was as follows: Savage Mining Company—Receipts and disbursements for the year ending 16th of July, 1888: Disbursements—Cash indebtedness July 13, 1887, \$94,661.48; taxes, \$1874.48; materials, \$24,299.98; combination shaft, \$2677.78; books and stationery, \$386.89; office expense, \$3678.52; ores, \$14,747.70; timber and lumber, \$30,377.94; interest and exchange, \$4932.77; labor and salaries, \$138,315.12; insurance, \$1687.32; water and ice, \$4144.20; fuel, \$12,348; incidental expenses, \$4195.54; assaying, \$1871.52; surveying, \$275; legal expenses, \$4717.02; Suro tunnel royalty, \$14,952.25; reduction of ore, \$91,392; discount on silver, \$55,637.11; mint charges on fine bars, \$3944.04; express freight on fine bars, \$591.65; R. P. Keating, superintendent, \$18,597.57. Total disbursements, \$530,295.88.

Receipts—Bal. superintendents' account July 13, 1887, \$309.09; assessments, \$112,000; hullion, \$338,951.53; cash indebtedness, \$66,770.15; Suro Tunnel Company, \$4476.13; Virginia & Truckee Railroad Company, \$4788.98. Total receipts, \$530,295.88.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

NORTHWESTERN CONSOLIDATED M. Co., July 24. Location, Nevada. Capital stock, \$10,000,000. Directors—J. C. Corey, John N. Taylor, Frank A. Hseeey, Mrs. M. J. Church and John Hentchinson.

SIERRA WATER CO., July 24. Capital stock, \$2,000,000. Directors—H. Ward, F. E. Gladwin, Wm. Gruenhagen, F. W. McCondray and Joseph G. Kearney.

CALIFORNIA HYDRAULIC DREDGING CO., July 25. Capital stock, \$600,000. Directors—H. L. Coyer, M. D. Hyde, D. McNease, Chas. E. Wilson, E. S. Johnson, C. L. Haskell and Elbridge Denbrow.

MERCED ELECTRIC LIGHT CO., July 25. Capital stock, \$100,000. Directors—W. E. Dean, A. K. P. Harmon, Chas. E. Elliott, W. L. Dean and D. C. Bates.

THE De Long mine, Washington district, San Juan canyon, Nye county, Nev., has been sold to Salt Lake men for \$50,000, and it is anticipated that active operations will soon be commenced on it.

FORESTRY.—The State Board of Forestry is in session in this city as we go to press. An account of the transactions will appear next week.

News in Brief.

SEVEN counties of Southern California give a population of 280,000.

LUMBER is being taken to Calico, and rebuilding will be pushed as fast as possible.

THE large hotel and railroad eating-house at Lathrop was burned on Monday last.

THE reservoir of Sweetwater dam, San Diego county, is to be stocked with lake trout.

CLAUS SPRECKELS of this city has just sold 5000 barrels of sugar in the Chicago market.

NEARLY every paper in the State speaks of the numbers of camping parties in the mountains.

GOLDENSON, the murderer of little Mamie Kelly, has been sentenced to be hanged September 14th.

THE Truckee Republican says there are 600,000 young trout at the Tahoe hatchery ready for distribution.

THE Lick Observatory did some capital work in taking observations of the moon during the late total eclipse.

THE New Mexican office and about \$60,000 worth of property at Santa Fe were burned Saturday morning.

IN 1833 California produced only 5,070,000 pounds of dried fruit. In 1887 the yield was 26,605,000 pounds.

THE Humboldt Standard is in favor of raising the assessment on timber land in the county from \$10 to \$30 an acre.

THE United States patent rights for Edison's phonograph have been sold to J. H. Lippincott of New York for \$1,000,000.

COLUSA farmers hire boys with slingshots to drive away birds from their orchards. One boy killed 27 jaybirds in two hours.

IN Santa Rosa is a church built of lumber and made entirely from one tree, shingles and all, with 10,000 shingles in excess of the hill.

THE bark Ottago went ashore at Point Reyes during a fog, and is a total loss. The crew pulled in their boat and landed at Folsom street wharf late Saturday night.

THE waters of the north fork of the Feather river have been turned into Big Bend tunnel, and the company is getting ready for putting a large body of men to work on the river-bottom, left dry.

AT Placerville, William Voss, a resident of Diamond Springs township, El Dorado county, while driving a team, dropped one of the reins, and, reaching for it, he fell to the ground and broke his neck.

THE Kern County Californian says that Haggis & Tevis and Lux & Miller have arranged their difficulty about irrigation and have signed an agreement to stop litigation and to spend their money in improving their vast landed estates.

THERE will be great demand for carpenters and other mechanics in Suisun as soon as the debris is sufficiently cleared away to allow building to commence. The town will be rebuilt on the old site and not in Fairfield as was at first reported.

THE monster log raft, or rather log ship, that has just been completed for James D. Leary, was successfully launched into the Bay of Fundy, at Joggins, N. S., Monday. The ocean tug Morse towed it out into the bay, and will soon start to tow it to New York.

THE Commissioner of Internal Revenue has submitted a preliminary report of his bureau's operations for the year ending June 30th. The total collections were \$124,326,474, an increase of \$5,649,743 over the previous year. Nearly the whole of the increase was upon spirits and fermented liquors.

THE philanthropist who generously donated \$30,000 to six churches, a few days ago, five of which are in this city, and who was at the time reported to be ill and confined to his room, turns out to be A. Montgomery, now a resident of this city and a millionaire, but formerly a resident of Colusa.

THREE weeks ago Louis Genisio, the porter of a hotel in Santa Rosa, tried to dislodge a rat from its hiding-place under some boxes. The rat was in close quarters and inflicted a savage bite on Genisio's hand. Early last week inflammation set in, and the prospects are that Genisio will lose his right arm. HERETOFORE milletofts have been shipped from San Francisco to Fresno. The tales have been turned, however, and on Saturday 30 carloads of Fresno products were shipped to San Francisco. The first 25 were bran, middlings and other feed; the next four were wine, and the other car was loaded with watermelons.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Commonwealth, July 26, \$50,000; Confidence, 25, \$54,647; Hale and Norcross, 24, \$30,000; Bluebird, 18, \$15,000; Mt. Diablo, 25, \$18,978; Confidence, 23, \$18,078; Hale and Norcross, 21, \$11,000; Hanauer, 18, \$4200; Germania, 18, \$2033; Hanauer, 19, \$1900; 20, \$1700.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M Co.	Nebraska.	40.	25.	June 5, July 10.	July 31.	L. O'Brien.	330 Montgomery St.
Bodie Tunnel M Co.	California.	15.	25.	June 5, July 10.	July 31.	C. C. Harvey.	303 California St.
Baltimore M Co.	Nebraska.	15.	25.	June 30, Aug. 1.	Aug. 22.	W. W. Tenney.	402 Montgomery St.
Belcher M Co.	Nebraska.	35.	50.	July 18, Aug. 22.	Sept. 13.	J. Crockett.	327 Pine St.
Diana & S M Co.	Nebraska.	15.	10.	June 5, July 10.	July 31.	J. J. W. Pew.	310 Pine St.
Eldred M Co.	California.	1.	51.	May 28, June 18.	July 31.	N. A. Edholm.	1533 California St.
Emmett M Co.	Nebraska.	3.	62.	July 12, Aug. 17.	Sept. 7.	J. J. Stanford Jr.	342 Montgomery St.
Gould & Curry M Co.	Nebraska.	50.	50.	June 22, July 26.	Aug. 16.	A. K. Durbrow.	309 Montgomery St.
Gray Eagle M Co.	California.	3.	95.	July 7, Aug. 11.	Aug. 31.	T. Wetzel.	322 Montgomery St.
Great Western M Co.	California.	1.	10.	July 17, Aug. 24.	Sept. 14.	A. Halsey.	373 Montgomery St.
Kearney M Co.	California.	2.	50.	July 16, Aug. 25.	Sept. 23.	M. P. Minor.	375 Montgomery St.
Leone Jack M Co.	California.	2.	10.	July 11, Aug. 16.	Sept. 7.	J. J. Scoville.	309 Montgomery St.
Live Oak Drift M Co.	California.	9.	15.	June 13, July 17.	Aug. 6.	J. M. O'Brien.	328 Montgomery St.
Potosi M Co.	Nebraska.	30.	50.	July 13, Aug. 16.	Sept. 6.	O. E. Ell-4.	339 Montgomery St.
Russell Reduction & M Co.	California.	2.	10.	June 5, July 10.	July 31.	J. Norzilo.	328 Montgomery St.
Silver King M Co.	Arizona.	1.	50.	June 22, July 30.	Aug. 21.	J. Nash.	328 Montgomery St.
Sonoma M Co.	California.	10.	10.	June 8, July 11.	July 31.	G. W. Seaton.	379 Montgomery St.
Seg Belcher & Miles Com M Co.	Nebraska.	1.	25.	June 5, July 9.	July 30.	E. H. Holmes.	339 Montgomery St.
Sierra Nevada M Co.	Nebraska.	32.	10.	July 10, Aug. 14.	Sept. 1.	L. E. Parker.	309 Montgomery St.
Surfing Valley M Co.	California.	3.	10.	July 19, Aug. 25.	Sept. 24.	H. Fisher.	340 Sansome St.
Tulio M Co.	California.	35.	65.	July 5, Aug. 7.	Aug. 25.	R. Hancock.	Grass Valley
Venus M Co.	California.	3.	35.	July 3, July 31.	Aug. 20.	J. Calver.	132 Fourth St.
Western Mineral Co.	California.	2.	1.00.	June 21, July 30.	Aug. 20.	A. Cheneault.	328 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Benton Con M Co.	California.	V. R. Allen.	330 Pine St.	Annual.	July 27
Itasca Con M Co.	Nebraska.	W. Whitmore.	Phelan Block.	Annual.	Aug 6
Marshall M Co.	California.	L. V. Dorney.	Grass Valley.	Annual.	Aug 26
Marion White M Co.	Nebraska.	A. B. Cooper.	332 Montgomery St.	Annual.	Aug 26
McMillen M Co.	Nebraska.	J. Morison.	328 Montgomery St.	Annual.	Aug 1
North Belle Isle M Co.	Nebraska.	J. W. Pew.	310 Pine St.	Annual.	July 27
New York Hill M Co.	California.	J. B. Leighton.	313 Montgomery St.	Annual.	July 30
Yellow Jacket M Co.	Nebraska.	W. H. Blauvelt.	Grass Valley.	Annual.	July 30

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nebraska.	A. W. Havens.	309 Montgomery St.	50	July 12
Confidence S M Co.	Nebraska.	A. S. Groth.		2.00	July 10
Eureka Con M Co.	Nebraska.	H. P. Hutton.	306 Pine St.	25	July 9
North Belle Isle M Co.	Nebraska.	J. F. Pew.	310 Pine St.	50	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	July 11
Halo & Norcross S M Co.	Nebraska.	J. F. Lightner.	309 Montgomery St.	50	July 9
Idaho M Co.	California.	J. F. Lightner.	230 Montgomery St.	1.00	July 11
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	310 Pine St.	65	June 12
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	65	June 12

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING JULY 17, 1888.

386,421.—FILTHER—R. Arnold, Oakland, Cal.

386,421.—BOX-FASTENER—Jos. Davy, Oakland, Cal.

386,319.—BRACE AND BIT—Isaac Holliday, S. F.

386,349.—WHEEL GUARD FOR CARS—P. Portois, S. F.

386,267.—WEATHER STRIP—R. C. Redman, S. F.

386,275.—THRILL COUPLING—A. J. Spicer, Portland, Ogo.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, July 28, 1888.

ANTIMONY—French Star.	9 @ 94
BORAX—Refined.	7 @ 7
Concentrated.	6 @ 6
COPPER—	
Bolt.	26 @ —
Sheeting.	26 @ —
Bar.	7 @ 20
Fire Box Sheet.	— @ 25
Iron—Glenbrook ton.	— @ 28 50
Eglington, ton.	— @ 27 00
American Soft, No. 1, ton.	— @ 31 50
Oregon Pig, ton.	21 @ 23 04
Clay Lane White.	— @ 23 00
Shotts, No. 1.	— @ 23 00
Bar Iron (base price) 1 lb.	2 @ —
LEAD—Pig.	5 @ 00
Bar.	5 23 @ —
Rheet.	8 @ —
Pipe.	7 @ —
Shot, discount 10% on 500 bag.	Drop, 1/2 bag.
Buck, 1/2 bag.	1 75 @ —
Ohilled, do.	1 95 @ —
Stral—Englab, lb.	16 @ 20
Black Diamond tool.	10 @ 16
Pick and Hammer.	3 @ 10
Machinery.	4 @ 5
Toe Calk.	44 @ —
TINPLATE—Coke.	5 75 @ 6 60
Charcoal.	6 @ 7 25
QUINOLINER—By the barrel.	35 @ 40 00
Flasks, new.	1 05 @ —
Flasks, old.	85 @ —

New York Metal Market.

Telegraphic advices dated July 26th give the following New York prices:

BAR SILVER—91 1/2 per oz.

BORAX—Jc.

COPPER—LARK—\$16.95

IRON—No. 1, \$22.00

LEAD—\$3.34 @

TIN—\$10.25 @

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Easier, spot closing at \$16.50 @ 16.80. Transferable Notices (Lake) issued at \$16.50 @.

LEAD—Firm, at \$3.87 1/2 @ 3.92 1/2. Transferable Notices issued at \$3.97 1/2 @.

TIN—Firm, at \$18.50 @ 19.00.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.

Australia, Tin, @—; Billiton, Tin, @—; Banca Tin, @—; Baltimore Copper, \$14.75 @ 16.00; Orford Copper, \$15.00 @ 17.75; P. S. C. Copper, @—; Foreign Lead, \$3.04 @ 25; Foreign Spelter, \$6.10 @ 6.16; Antimony, \$10.12 @ 13.30.

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C. E. WILLIAMS—Yuba and Sutter Co.'s.

JOHN L. DOYLE—Oregon, Montana and Idaho.

F. B. GREEN—Butte and Co.

W. W. THORNTON—Sonoma, Napa and Yolo Co.'s.

F. B. LOGAN—Lake Co. and Nevada State.

S. J. LITTLEFIELD—Santa Barbara, Los Angeles and San Diego Co.'s.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 5.	WEEK ENDING July 12.	WEEK ENDING July 19.	WEEK ENDING July 26.
Alpha.	1.55	1.70	1.75	2.10
Alta.	1.40	1.55	1.55	1.60
And.	1.00	1.20	1.25	1.30
Argenta.	1.10	1.15	1.15	1.15
Belcher.	4.10	4.50	4.50	4.35
Bodie.	3.25	3.75	3.75	3.75
Bullion.	1.15	1.25	1.30	1.25
Baltimore.	.75	.80	.55	.70
Belle Isle.	.50	.65	.55	.60
Bodie Con.	2.25	2.40	2.50	2.50
Boston.	2.00	2.00	2.00	2.00
Bodie Tunnel.	1.00	1.00	1.00	1.00
Bulwer.	.80	.85	.85	.85
Con. Va. & Cal.	.90	1.10	1.10	1.10
Change.	1.00	1.00	1.00	1.00
Champion.	3.65	3.65	3.65	3.65
Chollar.	1.00	1.00	1.00	1.00
Confidence.	.19	.20	.19	.17
Con. Imperial.	.45	.45	.45	.45
Caledonia.	.35	.40	.35	.40
Con. Pacific.	.40	.40	.40	.40
Crown Point.	1.20	1.40	1.40	1.40
Crocker.	.90	1.00	1.00	1.00
Central.	.40	.45	.45	.45
Dudley.	1.00	1.00	1.00	1.00
East B. & B.	1.00	1.00	1.00	1.00
Eureka Con.	6.50	7.00	7.00	7.00
Exchequer.	1.15	1.25	1.20	1.20
Grand Prize.	2.25	2.45	2.25	2.25
Gould & Curry.	3.05	3.25	3.05	3.05
Hale & Norcross.	7.25	7.50	7.25	7.25
Holmes.	1.00	1.00	1.00	1.00
Independence.	1.00	1.00	1.00	1.00
Julia.	.40	.40	.40	.40
Justice.	1.00	1.05	1.10	1.10
Kentuck.	2.10	2.70	2.70	2.70
Lady Wash.	.35	.35	.35	.35
Martin White.	1.45	1.50	1.50	1.50
Mono.	1.45	1.50	1.50	1.50
Mexican.	3.60	3.70	3.70	3.70
Mt. Diablo.	1.00	1.00	1.00	1.00
Northern Bull.	1.80	2.15	2.15	2.15
North Belle Isle.	3.85	4.00	3.85	3.80
Niagara.	4.70	4.85	4.90	4.90
Nev. Queen.	1.30	1.35	1.35	1.35
North O. & C.	1.30	1.35	1.35	1.35
Occidental.	1.30	1.35	1.35	1.35
Ophir.	.65	.70	.70	.70
Overman.	1.75	1.90	1.85	1.85
Potosi.	3.30	3.40	3.40	3.40
Piedmont.	1.80	2.00	2.25	2.25
Perr.	.65	.70	.65	.70
P. Sheridan.	1.00	1.00	1.00	1.00
Silver Star.	2.50	2.60	2.60	2.60
Savage.	1.00	1.00	1.00	1.00
S. B. & M.	2.70	2.85	2.70	2.70
Siorra Nevada.	3.45	3.75	3.30	3.30
Silver Hill.	.55	.60	.55	.55
Silver King.	1.00	1.00	1.00	1.00
Scorpion.	.65	.70	.65	.70
Syndicate.	.20	.20	.20	.20
Union Con.	3.50	3.70	3.35	3.35
Utah.	1.40	1.50	1.50	1.50
Yellow Jacket.	5.00	5.10	5.00	5.00

Sales at San Francisco Stock Exchange.

WEDNESDAY July 25.		730	Grand Prize.	2.65	
100	Alpha.	1.90	165	Hale & Nor.	.65
150	Alta.	1.60	150	Harlow.	1.50
150	Baltimore.	.45c	150	Mexican.	3.80
300	Belcher.	4.00	100	Mono.	1.25
250	B. & Belcher.	4.75	150	N. Belle Is.	3.80
120	Bullion.	25	300	Nev. Queen.	.71
550	Bodie.	2.00	100	Navajo.	1.85
100	Bulwer.	.70c	230	Overman.	1.95
500	Chollar.	3.00	250	Ophir.	.55
100	Con Va & Cal.	1.20	200	Occidental Con.	1.55
100	Crown Point.	4.40	200	Potosi.	2.90
200	Con. Imperial.	.55	100	Perr.	.60
5	Confidence.	.18c	80	Savage.	.30
100	Crocker.	1.0	230	S. B. & M.	3.40
500	Caledonia.	.40	70	Sierra Nevada.	4.25
20	Challenge.	.55	20	Utah.	1.45
100	Exchequer.	1.70	350	Union.	3.50
250	Gould & Curry.	2.65	55	Yellow Jacket.	4.60

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R. B. VAN DUSEN, a prominent mining man in Utah, had his right hand crushed in the new Emma mill at Alto, necessitating amputation.

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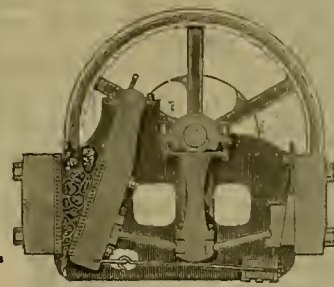
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The volume embraces 106 1/2 pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by Dewey & Co., Publishers, No. 252 Market street, San Francisco.

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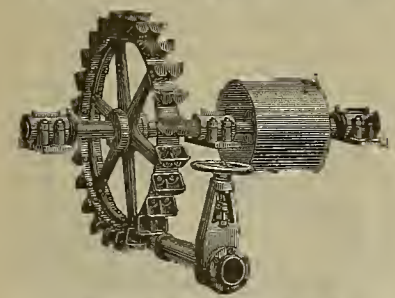
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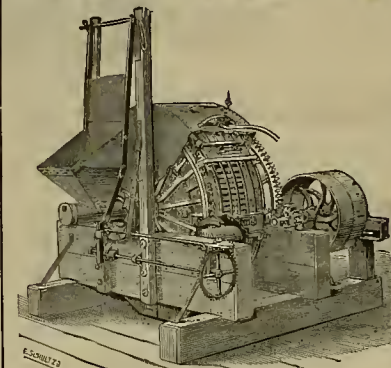
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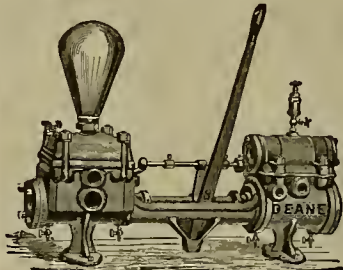
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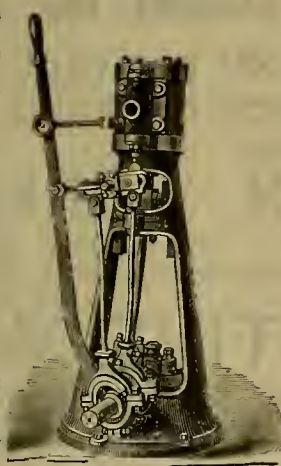
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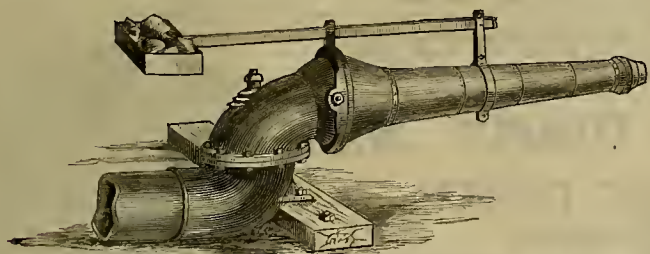
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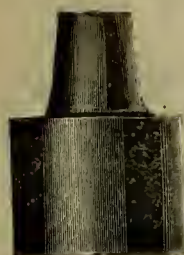
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CRUSHER PLATES,
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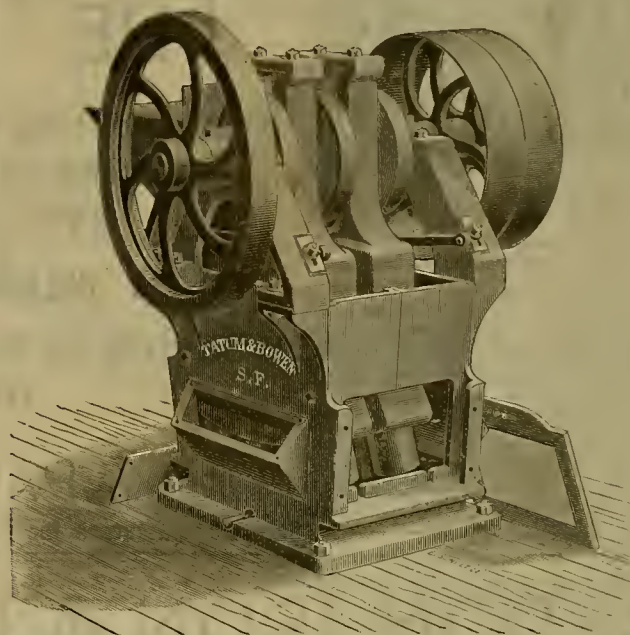
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Orders solicited, subject to above conditions.
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THE DOUBLE "ECONOMIC" STAMP MILL.



We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp
is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the ra-
pidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so
that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in
any other mill to do the same amount of work.

The Mortar has screens at both ends, giving ample discharge. There are no cams or tap-
pets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

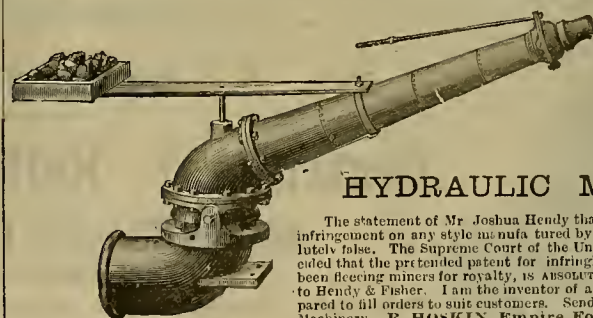
Several Mills are now in the mines doing excellent work. The "Economic" is not only a
mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE
LARGEST CAPACITY.

TATUM & BOWEN,

34 and 36 FREMONT STREET,

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Manufacturers of Mining and Sawmill Machinery, Engines, Boilers, Etc.

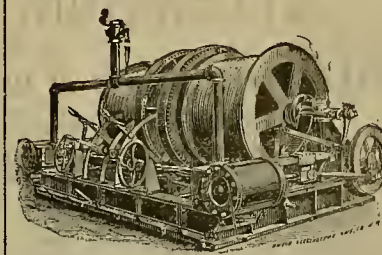


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IMPROVED
ONE-JOINTED

HYDRAULIC MACHINE.

The statement of Mr. Joshua Hendy that ANY STYLE of machine is
infringement on any style manufactured by him, he knows to be also
lately false. The Supreme Court of the United States on March 10th de-
clared that the pretended patent for infringing, which he has for years
been fleeing miners for royalty, is ABSOLUTELY VOID, with costs of suit
to Hendy & Fisher. I am the inventor of all styles in use, and am pre-
pared to fill orders to suit customers. Send for list of prices of Hydraulic
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HOISTING ENGINES FOR MINES.



1, 2, or 4 Drums, with Reversible Link
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OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

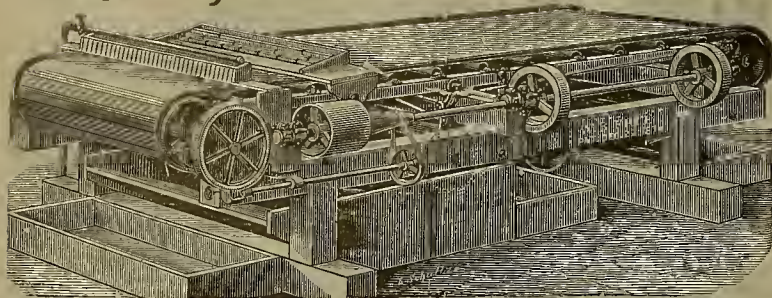
THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

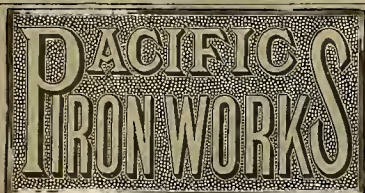
ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

ADAMS & CARTER, Agents Frue Vanning Machine Co.,
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THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.



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MINING MACHINERY.

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

THE HAZELTON BOILER

Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

IT IS UNEQUALED FOR SAFETY, ECONOMY AND DURABILITY.

A Saving in Fuel of at Least 20 per cent Guaranteed over any other form of Boiler.

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Sole Manufacturers for the Pacific Coast,

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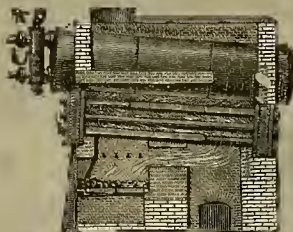
L. R. MEAD, Secretary.

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Manufacturers and Sole Agents for the Pacific Coast for

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BOILER.



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AND FACILITY OF INSPECTION and REPAIRS.
60,000 Horse Power now in use.

Boilers can be seen working in San Francisco at Palace Hotel, Spring Valley Water Works Hueter Bros. & Co., California Jute Mills, and other places.

Guaranteed More Efficient than any other Boiler made.

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QUARTZ MILLS—Gold and Silver, Copper and Lead Smelting Works, Roasting Furnaces of all kinds.

AIR COMPRESSORS—Rope Power Transmission.

HYDRAULIC PUMPING and Hoisting Machinery.

WROUGHT-IRON WATER PIPE a Specialty. Note.—Have just completed order for 35 miles of 44-inch pipe of 4-inch iron for Spring Valley Water Works Company, San Francisco.

SAW-MILL MACHINERY of all kinds.

STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

SOLE MANUFACTURERS for Pacific Coast of the Celebrated "Heine" Patent Safety Boiler (Water Tube); 60,000 horse power now in use.

MACBETH PATENT STEEL-RIM PULLEYS—Fifty per cent lighter and 25 per cent cheaper than cast-iron pulleys; will not break in transportation.

REFRIGERATING MACHINERY for Steamships, Breweries, and Cellars.

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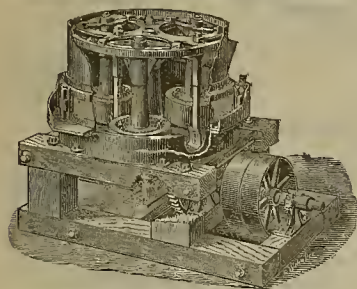
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SUGAR MACHINERY—Sugar Mills, Vacuum Pans, Clarifiers, Double Effects, etc.

STEAMSHIPS—Steam Yachts, Marine Engines and Boilers, Screw Propellers, Centrifugal Pumps, Steamship Pumps, Steam Capstans, Cargo Winches, etc.

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Centrifugal Roller Quartz Mill.

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Centrifugal Roller Quartz Mills,

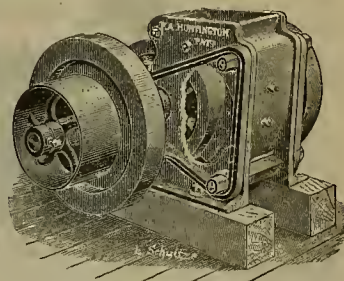
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Mining Machinery of Every Description,

Steam Engines and Shingle Machines.

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Silver-Plated Amalgamating Plates

For Saving Gold in QUARTZ, GRAVEL and PLACER MINING,

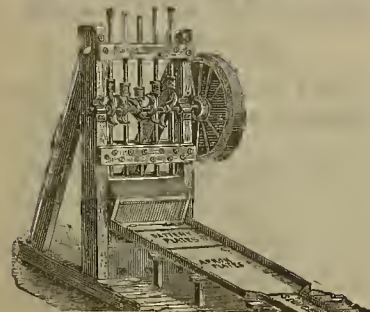
At reduced rates. Get our prices. Three thousand orders filled. Fifteen medals awarded. Our plates have proved the best, and far superior to others in weight of silver and durability. Old mining plates replated. These plates can also be purchased of JOHN TAYLOR & CO., cor. First and Mission Sts.

SAN FRANCISCO GOLD, SILVER and NICKEL PLATING WORKS,

E. G. DENNISTON, Proprietor.

653 & 655 Mission St., San Francisco, Cal.

NOTICE.—Our Silver Plated Plates have always proved as represented. We have been manufacturing them for 20 years, and use only the best Lake Superior Copper and Refined Silver. Comparing our plates with those of other manufacturers, after repeated tests, we can safely guarantee much better plates for the same money. Our plates are used by all the prominent mining men on the Pacific Coast. SEND FOR CIRCULAR.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 4, 1888.

VOLUME LVI
Number 5.

New Appliances for Working Gravel Deposits.

The Pacific Iron Works of this city have recently been constructing two machinery plants for working gravel, the operations of which will be watched with unusual interest. The first is for the Vallejo Company of Calaveras county, and consists of a combined pumping and hoisting rig, operated by the Pelton water-wheel.

The gravel, after being hoisted from the shaft, is admitted into a revolving cylinder, made of boiler iron, with projecting flanges on the inside, the cylinder being 36 inches diameter by 16 feet long, and provided with a heavy iron screen at the lower end for the purpose of separating and carrying off the boulders and heavy gravel. The revolving cylinder is intended to disintegrate the material sufficiently to allow of subsequent treatment by the ordinary method of sluicing.

The second plant referred to is for the Wheaton mine at Smartsville, Yuba county, and consists of a Gates crusher, Reliance batteries and Duncan concentrators, also driven by a Pelton wheel. The gravel in this instance not being very coarse, and the gold-bearing cement adhering to it so firmly, it is proposed to crush the entire mass and put it through the batteries the same as ordinary quartz. The gravel carries with it a considerable percentage of black sand, rich in free gold, which it is proposed to save by concentration.

The Gates crusher will put the material into the battery from three-eighths down to 20 mesh, and the batteries having discharges on four sides, it is expected will handle at least four tons to the stamp of material reduced to this fineness.

Good results are anticipated from both operations referred to, details of which we shall take occasion to give when the works are started up.

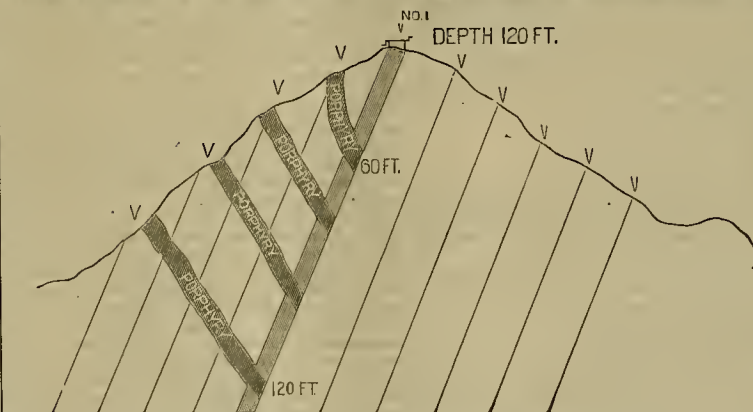
BRYAN ROLLER MILLS.—On Saturday last, at the Risdon Iron Works, a large Bryan patent roller quartz-mill was exhibited in operation, and attracted quite a number of persons interested in quartz-reducing appliances. This five-foot mill is the largest of this pattern which has been built; it has a capacity of 30 tons a day—hard rock. It was made for the Bogart mine, near Oroville, Butte county. Some few changes have been made in the operating parts since this mill was illustrated in the PRESS. In the smaller mills the rollers are driven from their peripheries by the iron tank or drum around which the actuating belt passes. In this case, however, the rollers are driven similar to the method employed in the Chili mill. There are three rollers used. Three mills of this pattern have been running successfully for the past two years on the San Dimas mines; one is running steadily at a mine on the James river, Va., and others are in use in this State.

A COMPANY has been formed in Pittsburg to open a tin mine in Mexico, near Durango. A tract of land has been purchased covering an area 10 miles square. An expert who assayed the ore says it will yield from 25 to 30 per cent of tin. The distributing point will be El Paso.

PRICE OF LUMBER.—The Pacific Pine Lumber Company of San Francisco has reduced its prices for lumber on an average of \$2.50 a thou-

sand feet, commencing with to-day. The reduction covers all lines of pine, fir and spruce lumber and timber, and is followed also by a

However that may be, the reduction is likely to continue for awhile, at least if what some of the proprietors of yards around the city think



CASHIER MINE, EXCHEQUER DISTRICT.

similar reduction in redwood, though the company claims not to be able to control the redwood market, nor is it on their printed list.

to be true. Very much less lumber is being shipped to the southern counties than was the case last year.

Exchequer Mining Camp.

We have recently had several articles concerning the geological formation of Exchequer district, San Bernardino county, in this State. Our correspondent there sends us the following with the accompanying sketch: Spawforth & Spencer are doing considerable work on the Cashier mine, and are taking out some very fine ore. The incline sunk four years ago to the depth of 60 feet on a vein of six feet in thickness was cut off completely by a wall of porphyry and not a pound of ore left in sight. Ten tons of ore sorted from the vein sold at Kingman for \$175 per ton. The opinion of all experienced miners was that the vein had faulted and it would require a large company with big capital to find the vein. The owners concluded from the surface indications that they had 25 feet of porphyry to cut through to find the other wall, as the cut of same published by you May 12th would indicate.

Two shots only were fired when they struck the original vein on the other side of an eight-foot wall of porphyry. This virtually unlocked the key to the district, as porphyry wall after porphyry wall has since cut the vein and enriched it at every intersection, and the vein has been steadily improving, until they have opened up the vein over 60 feet below, where the first porphyry wall cut off the vein at 60 feet. They think they have found the apex of a large ore chute at incline No. 3, which is 200 feet west of incline No. 1, at a depth of ten feet. They are taking out ore that averages \$175 per ton, with a vein about 15 inches solid ore, selected specimens of which will run into thousands.

They also have a four-inch vein which at five feet from the surface averages \$200 per ton. Spawforth and Spencer are to be congratulated on their good luck, and they deserve it. As they are men of limited means, there will be an opportunity for capitalists to get a good layout from them. The formation of the hill is different from anything ever discovered before. I send a diagram showing the strike of the veins east and west dipping to the north at an angle of 45°, intersected by porphyry walls at distances of 10 and 35 feet. Below these porphyry walls the vein is renewed with very high-grade ore, in one instance enriching it to the extent of 508 ounces of silver over 12 inches thick. The sketch shows a cross-section at incline No. 1; the shaded lines represent porphyry; V are the veins.

C. F. SAROENT, who has resided continuously at Kodiak, Alaska, for 21 years, says the natives often bring him specimens of rock which assay well in gold and silver. He is confident that as good mines will be found in that region as have been developed on Douglas island. As a rule, the prospects are not far from tide-water and the ore could be easily shipped.

PRESS-TANK.—The engraving on this page represents the press tank used in the mechanical treatment of the products in the Russell process. In the continued article on this process, now running in the PRESS, this, and other mechanical appliances which we shall illustrate, will be described in detail. The drawing is made to scale.

SAN DIEGO is to call for an election to issue bonds to the amount of \$2,000,000 to purchase the water works now owned by the San Diego & Coronado Water Co. and the Flume Co.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—EDS.

From the Comstock.

EDITORS PRESS:—The output of ore at the Hale and Norcross, Savage, and Confidence, and for June and July at the Con. California and Virginia, has been considerably curtailed on account of the hanging up of the stamps at the mills on the Carson river, necessitated by the low stage of the water and the entire suspension of the extraction of ore at the Yellow Jacket mine. The Hale and Norcross has the use of 20 stamps at the Nevada mill and may have the use of the 20 additional stamps that have lately been added to the 40 that have been in use since the mill first started up. This mill is at the Chollar mine and driven by water obtained from the "Virginia and Gold Hill Water Co." Twenty stamps at that mill are reducing Chollar and Potosi ore. The Gould and Curry ore is reduced at the Douglas mill in Lower Gold Hill and driven by steam. The California battery-mill of 80 stamps and the pan-mill are being made ready to reduce ore from the Con. California and Virginia, which will be begun on the first of August next, and will reduce 300 tons daily. The Boss process will be in use as heretofore at the pen-mill, and gave entire satisfaction. The battery and pan-mills will also be driven by water supplied by the water company. The Con. Cal. and Virginia Co. carried over \$156,000 to July account, so that they will be able to pay the usual dividend of 50 cents per share, aggregating \$108,000, and, of course, continue to pay the same dividend monthly for a long time to come. The Morgan mill at Empire, being driven by steam, will be kept running as usual on their ore.

There will be a mill erected at the Woodville shaft of the Justice mine, to reduce the ore already on the dump and what will be extracted in the future. There are now out from 1700 to 1800 tons of ore. The Alta mill (steam) is kept running on ore from the mine and reduces and concentrates 25 tons per day. The Overman is extracting ore, but can only occasionally secure milling facilities. The Thompson mill in Lower Gold Hill is running on ore from the Oest and Haywood mines at Silver City. The Excelsior and Atlanta mills (steam) are running on ore from the Occidental mine, which mine is not on the Comstock lode, but on the Brunswick lode lying to the east of the Comstock. There is some ore being reduced at the small water mills in Six-mile canyon, and will continue to be as long as the water is of sufficient quantity to run them. Although milling facilities are not adequate to reduce the amount of ore that could be extracted from the Comstock lode mines, yet the ore will be held in reserve until that want has been overcome, and in the meantime other bodies of ore are likely to be developed, as prospecting will be vigorously prosecuted in all of the mines whether producing now or not. The Crown Point, Belcher and Segregated Belcher will be in a condition to yield ore before milling facilities can be had.

The water in the Carson has fallen off much earlier this season than heretofore on account of the small amount of snow that fell in the Sierras last winter, and it is not likely that there will be sufficient supply again before October or November to enable the mills to be started up. The Confidence ore is reduced at the Brunswick mill, which is driven both by steam and water, but the water failing, only the number of stamps that can be kept dropping by steam-power will be run.

JAMES DELEVAN.

Virginia City, Nev., July 24th.

Placer County Mines.

EDITORS PRESS:—The mines and mills generally in and around Ophir and Newcastle are lying dormant, with the exception of two small custom mills in the Ophir, owned by W. H. Fidd, the Lawrence at Ophir and two Bryn rolling-mills at Newcastle.

The mills and mines are lying idle on the Julien, New Year, Gold Blossom, Three Stars, St. Patrike, Peleter, Hathaway, Green and others. Many of these are only temporarily closed, while a few will be permanently from various causes.

General inactivity seems to prevail throughout this county in mining operations. Although decidedly a mining county, yet the class of people who have of late years come in have turned their attention almost exclusively to agriculture and fruit-raising.

NEW LUMBER INCORPORATION.—The Northern California Land and Lumber Co. to deal in lumber, colonizing and cultivating lands, constructing water ditches, etc. The capital stock is \$1,000,000, divided into 20,000 shares. Directors—Frank Dalton, George M. McCarthy, George H. Foster, George McCord, David Bueh, George H. Mitchell and Thomas L. Potter.

A NEW MACHINE.—The new machine just invented for printing postal-cards prints them from the roll and turns them out in packages ready for delivery. It runs them off at the rate of 300 a minute, with paper bands pasted around each 25. It is said one man can look after two machines.

Mining in Nevada County.

Graes Valley.

EDITORS PRESS:—This beautiful little mountain town is without doubt one of the liveliest mining towns in the State, which is owing to the great activity in the development and steady working of the various mines in and around the town.

Many old mines that have been abandoned for years have been reopened and are now proving among the best in California, paying from the very starting up of work. This has given a stimulus to many to prospect, and has caused reopening of numerous old claims that were left years ago. Thus the future prosperity of the place is assured, success having been attained in almost every instance.

The general thrift of the place is fully attested by the very neat homes of the residents and the extreme taste and neatness of attire of the younger members of the community, all of whom present an appearance that might be envied by many larger places much more favored by locality and advantages.

Much prospecting is being done all around Graes Valley and shafts are being sunk in every direction, the windlass being the hoisting power. Most all the ledges lie very flat, being generally at an angle of 35 degrees or thereabouts in the largest and deepest of the mines. This enables them to hoist by car in many cases instead of using buckets or cages.

Most of the hoisting works are run by water-power, this region having the most abundant supply in the State, lasting the entire year through.

The W. Y. O. D. Company.

This mining company is entirely composed of young men of Grass Valley, the oldest of whom is not 30 years of age. They do all their own work. Thus the significance of the initials which designate the name, "Work Your Own Diggings Co." These young men struggled along for years in opening up the ground, till now they are down about 300 feet taking out rock that will mill in free gold about \$18 per ton. Parties have recently tried to bond the mine for the sum of \$75,000, but they now say "no, no bond to any one—cash only will take it." At first they were refused credit and had to scratch hard to live; and had not the banking firm in Grass Valley stepped in and assisted them they would not now be in the prosperous condition that is warranted by the outlook.

They are now crushing ore in a mill hired by them for the occasion.

The Empire Company and Ophir Mill.

This company is in the very height of its prosperity. Everything in and about the mine and mill is running smoothly. The ore is of excellent grade and the mill comparatively new, with all the latest improvements. Prospects ahead are sufficiently bright to justify them in thinking of erecting additional works in the near future. This property is under the management of quite a young man, Mr. Geo. W. Starr, who should be proud of so distinguished a position on such a magnificent property.

The Smith Claim.

This company is now down about 700 feet, taking out ore and crushing in the mill, which is one of the oldest and most primitive in construction. The amalgamation is chiefly done by means of the old style—Atwood concentrators. The sulphurets are all blanketed and then are ground in pans by mallets. The vein matter is quite small, but pays from \$18 to \$50 per ton.

The Omaha Mine.

Near Allison Ranch, is running in full operation, employing about 40 regular hands, besides numerous tributaries in the old parts of the works. The mill is one of the old style, and most probably will be long replaced by a new one, that being the intention at present. The ledge, like all others throughout the section of Grass Valley and Nevada City, is small, but efficiently rich to fully make up. The grade of ores generally hereabouts runs from \$15 up to \$80 per ton, free milling, without counting the sulphurets.

The North Star Mine and Mill.

This company can well afford to rest on their laurels, having one of the very richest of mines. Specimens of ore in the superintendent's office show gold very freely, and the company has it in quantity in the mine. As to the mill, it is simply perfection, being automatic from the time it receives the ore until the amalgam is turned out.

Nevada City.

This once most flourishing town, I am sorry to see has apparently gone into a decline that seems to have paralyzed every industry in it. This has been caused, first, by the stoppage of hydraulic mining, and later on, by the cessation of most of the quartz mining.

Hereafter to be found some of the most elegant little homes in the State, all of which seem destined to become desolated and forsaken unless some method can be devised, or some modification of the debris question arrived at in the near future. Trade of every kind is stagnated. The farming interests, although flourishing as to products, cannot live unless fostered by the mining interests up here, on account of the lack of money and distance from markets. The quartz mining, with but few exceptions immediately around the town, has ceased to be remunerative at depth, the formation being in granite, and the ledge, all small at the best, have pinched out, so that at the present the outlook is truly to be regretted. W. A. K.

The Niehart District, Montana.

[From our Correspondent, R. G. HUSTON.]

EDITORS PRESS:—This district is one of the most promising in Montana to-day, as it is well established that good mines are here. The Hudson Mining Co. put up a smelter some years ago, but found by a practical test that their ore did not carry lead enough to make it a good smelting proposition alone. The Montana Central are about to extend the branch they built to connect with the Sand Conlee coal mines into the Niehart district, as they will soon have a portion of their large works at Great Falls ready to operate. On the group of mines in Niehart, owned by Hill & Chamberlain—the Montana Belle, St. Julian, Minnehaha, Maud S. and Dickens—they have two shafts 90 feet in depth and two tunnels; one of these is 75 feet, and another 150 feet in length, showing a three-foot ore body in all of the developments, carrying black sulphurets to the value of 100 to 125 ounces in silver per ton.

J. L. Niehart & Co. own a group of mines as follows: Homestake, Queen of the Hills and O'Brien. On the O'Brien they have a shaft down 60 feet; on the Queen of the Hills there is a tunnel 125 feet; and on the Homestake there is a tunnel 520 feet, where there is a six-foot vein carrying some lead and about 75 ounces silver.

The Florence, owned by A. M. Henry and R. G. Wight and G. L. Johnson, is developed by two tunnels; one 125 feet, the other 140 feet on the vein. The five-foot ore body carries brittle and native silver in abundance. The vein can be easily sorted to 150 ounces. Some very elegant specimens are on exhibition in Helena from this mine.

The Snowdrit, owned by Spencer, Mayne & Heitman, is another fine prospect. Tunnels have been run for some distance on this mine, but the ore body has not been crosscut at right angles. In consequence it is hard to say with any accuracy how much width of ore they have.

The Dakota, owned by Warren Toole and others, is developed by a tunnel 225 feet long. They have a nine-foot ore body and claim an average of 40 ounces assay value.

The Galt, owned by Messrs. Toole, Macin and Leder, is developed by a shaft 90 feet deep, and the ore in the bottom of the shaft samples 90 ounces in silver.

The Niehart district has mines of great merit within its limits without a doubt. Like many other regions in Montana points, it has been held down by the position as regards transportation. The Cooke City mines give another example of this kind. No railroad communication for low-grade mines means no work.

The Old Placer Mines.

In Confederate gulch, are with few exceptions played out. At Jas. King's badrock flume they have during the present season piped off 400 feet of the rim of the Montana Bar, where those immense fortunes were made during the early days of the camp. At one place in particular two men did not have credit for a sack of flour on Christmas, and the next September they left the camp with a four-mule team loaded with gold dust. Such windfalls as this are scarce, yet Messrs. Jas. King & Co. will no doubt make a handsome cleanup for this season, as they are in the best of their ground.

They were jnet pining down to quit, as their flush water season was about over. The other badrock flume was compelled to suspend operations, as King's tailings were coming down too thick for them.

The Water-Power at Folsom.

The chief engineer of the Folsom Water-Power Co. says that when the dam and canal in process of construction at the penitentiary at Folsom are completed the State will receive property rights worth \$500,000.

The prison will have 500-horse power from the dam, which would cost \$50,000 a year to operate were machinery put in place thereof.

There are at present 240 convicts working in the construction of the dam in the American river. It is to be built of granite, and will be 45 feet wide at the base, 25 feet wide at the top, 63 feet wide in the bedrock, and will have an overflow at freshet time of 20 feet. The total length of the structure will be 600 feet.

But there is urgent need for more men on the work, and 150 would not be too many. If this number could be obtained the canal would be completed in two years, but under the present circumstances the time will extend about six months beyond that date.

Figuring on a possible freshet in 80 days, although one may not come for 120 days, 120,000 cubic feet of granite in all would have to be laid, or 1500 cubic feet a day, in order to have the dam built up high enough to prevent a flood from destroying the foundation.

So anxious is the Folsom Water-Power Co. to secure additional labor in building the dam, that it has offered to take 100 or 150 extra convicts on account of what is known as the Livermore contract, wherein the State, several years ago, bound itself to furnish the company all the help required in building the dam, in return for certain concessions, and pay for these convicts at the rate of 50 cents a day during the low-water season. It is possible the desired arrangement may be made, although convicts are scarce in the market just now and bring a good price.

The Hidden Treasure Mine Fire.

In the PRESS of last week was a brief account of the fire at the Hidden Treasure mine, Placer county, where two miners lost their lives and a number of others had very narrow escapes. Concerning this fire the Auburn *Republican* says:

The care which brings the gravel out of the Hidden Treasure mine at Sunny South are hauled back into the long tunnel by a horse. About 1 o'clock last Friday afternoon as the animal was drawing a train of empty cars into the mine, he proceeded only a few hundred yards, when he stopped, and sniffing the air refused to proceed. It was with the greatest difficulty that his driver urged him forward as far as the blacksmith shop, which is in the tunnel about 5700 feet from the entrance. Before he reached the forge the driver discovered that something was wrong with the air, and he told the blacksmith, Forrest Brown, that something must be on fire. About 75 feet below the forge—that is, toward the mouth of the tunnel—is a shaft which leads up into the air drift above. Mr. Brown hastened to this shaft, and when he ascended he found the timbers in the air tunnel on fire and could hear the loud roaring of the flames. The fire was undoubtedly caused by sparks which had gone through the flue leading from the forge to the air tunnel to conduct away the gas. The fire shut off the current and the mine immediately began to fill with gas and foul air. Mr. Brown quickly gave the alarm to the miners. There were about 70 men in the mine, only 15 of whom were above the forge. Eight of these 15 and all the others who were below the forge escaped from the tunnel without much difficulty, although many of them were greatly exhausted before they reached the open air. One of them, John Bowring, better known since 1850 among miners as "Yank," unconcernedly started to walk out of the tunnel, but he fell on the way and died almost as soon as his companions carried him outside.

There were now seven men remaining in the mine above or beyond the blacksmith shop—six Chinese and a white man named William Rogers. Several men at once volunteered to go to their rescue, and the party consisted of Supt. Harold Power, Winfield Davies, John Kelley, J. B. Thomas, Robert McKatchnie, Charles Halstead and a Chinaman. As they proceeded into the tunnel, one by one they were overpowered and fell unconscious. Power, Davies and Kelley managed to reach a point within 60 feet of where they knew the miners were, but they could not see them and were unable to give an alarm before they themselves fell exhausted.

There was now a large number of excited men and women at the entrance to the tunnel, and as the first rescuing party did not return, others were formed and ventured in to save, if possible, those who were already in the mine. None, however, were successful, and nearly every man was overpowered by the foul air before he had proceeded far underground. At one time during the afternoon there were 30 men lying on the dump—all exhausted, and some of them unconscious after their efforts to penetrate the deadly air in the tunnel. The women worked hard in reviving the men, and had it not been for their efforts it is probable that several of the men would have died.

At last a party of three, Patrick and Thomas Halligan and Charles Middleton, entered the mine. This was Patrick Halligan's third trip, but the three succeeded in forcing their way to a point 60 feet above the forge. There they found the dead body of Robert McKatchnie. He had fallen with his face in the ditch at the side of the track and had been drowned. He leaves a wife and four children in Michigan Bluff. The three men were unable to proceed any further, and returned to the eager people outside with the report that those in the mine must have perished.

During the three or four hours when what has been related occurred, most of the first rescuing party were lying unconscious where they had been overcome. It seems, however, that the foul air confined itself to the main tunnel and did not penetrate the gangways where Rogers and the six Chinese were at work. At last Rogers took some loaded cars down to the main track and then discovered the condition of the air. Believing that there was a fire somewhere, he ran back for the Chinese and they quickly made up a train of empty cars and hastened to escape from their peril. They found Power and his party on the way and carried them into a gangway, where they regained consciousness. The Chinese then pushed out the cars carrying Harold Power, W. Davies, John Kelley and four Chinese. On the way they picked up J. B. Thomas, who was lying insensible across the track. The joy of the anxious throng who waited, expecting that these men were dead, knew no bounds when they found that they were safe.

It was after 5 o'clock when the last man emerged from the tunnel. The fire in the upper drift gradually died out, and a thorough examination shows that the actual damage to the property is only nominal, as the timbers were burned for a distance of only 70 feet, and the loss will not exceed \$200 or \$300 at the most. But if the loss of time be counted, the accident has cost the owners a much larger sum. Repairs have been made, and work was resumed in the mine on Monday morning.

A STEEL CAR WHEEL is expected to run 50,000 miles, but very few of them ever make that distance.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

Tables VII, VIII, IX, X, XI, XII, XIII, XXVI, XXVII, XXVIII and XXXI illustrate the changes taking place during roasting, and the effect of various sizes of crushing and percentages of salt on the results of the furnace work, as shown by assay-office leaching tests. Tables VII and VIII referring to the Stetefeldt furnace, IX to the Howell, X and XI to the reverberatory, and XII, XIII and XXVIII to the Bruckner, while tables XXVI and XXXI sum up and compare the furnace work by all the furnaces.

TABLE VII.

RESULTS OF ASSAY-OFFICE LEACHING TESTS, ONTARIO ORE ROASTED IN A STETEFELDT FURNACE.

Conditions Under which the Mill Tests Were Made.	By which Process Treated In Assay Office.	Per cent Extracted after 5 Hours in Furnace.	Per cent Extracted after 15 Hours in Furnace.	Per cent Extracted after 25 Hours in Furnace.
16 Screen—8 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	81.6	80.4	64.3
30 Screen—7.5 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3
16 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3
20 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3

In regard to the size of crushing, Table VII shows that with 12 per cent salt, a 16 and a 20 mesh screen on Ontario give about the same results. These results are probably as high as could have been given by a 30-mesh. The results are given more in detail in Table VIII.

TABLE VIII.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, ONTARIO ORE ROASTED IN A STETEFELDT FURNACE.

Ret. Fuc.	Shaft."	Ret. Fuc.	Shaft."	No. of Furnace.	Per cent of Soluble Salts.	Per cent of Soluble Salts.	Per cent of Soluble Salts.	Per cent of Soluble Salts.	Per cent of Soluble Salts.
1	1	2	2	1	1	1	1	1	1
2	2	3	3	2	2	2	2	2	2
3	3	4	4	3	3	3	3	3	3
4	4	5	5	4	4	4	4	4	4
5	5	6	6	5	5	5	5	5	5
6	6	7	7	6	6	6	6	6	6
7	7	8	8	7	7	7	7	7	7
8	8	9	9	8	8	8	8	8	8
9	9	10	10	9	9	9	9	9	9

For San Antonio ore, in a Howell furnace (Table XXVII) the change from 26 to 12 mesh produces no effect, while the San Miguel results are depressed 2.8 per cent by the same change. It should be stated that, while roasting San Antonio ore, some San Bartolo ore was always present.

Sombrerete ore (Table XXVII) in a reverberatory yields 2.7 per cent more with an 8-mesh screen than with a 30-mesh.

Table XII apparently indicates that a 10-mesh screen gives better results than a 26-mesh on Yedras ore, with a Bruckner furnace. That such is not the case is shown by the vault sample (Table XXVIII) for the same charge, which shows only 67.5 per cent extraction, or 16.6 per cent less than the furnace sample. The "vault" referred to is the chamber into which the roasted ore falls as it comes out of the furnace. The results on another charge also (Table XIII) show that the Bruckner furnace results are 4.5 per cent less with a 10-mesh screen than with a 26-mesh.

Table IV shows the effect of coarse and fine crushing on the leaching results in the mill. For Ontario and Sombrerete, the relation between the assay office and mill results remains the same whether a coarse or fine screen be used, and, for Ontario ore, whether the ore was from the shaft or the dust-chambers. But in the case of San Antonio the discrepancy between the mill and the assay-office results was increased 5.7 per cent by a change in crushing from a 26 to a 12 mesh screen, and in the case

of San Miguel ore, the same change caused an increase in the discrepancy of 3.6 per cent. As a rule, however, a 16 mesh screen gives as good results as a 30-mesh, and the leaching results in the mill will average within one per cent of the result in the assay office. Both the apparent exceptions given may be due to defects in the roasting. At Lake Valley, owing to the imperfection of the screening apparatus, much ore had to be leached which would not pass a 10-mesh screen. But it was found that the material which would not pass such a screen was chloridized just as high and yielded as high a percentage in both assay office and mill as that portion which would pass a 40-mesh. In the case of the Bremen tailings, as long as the leaching rate remained at about one half inch or more per hour, the difference between the mill and the assay-office extraction was only one-tenth to one-half ounce per ton.

TABLE IX.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, ONTARIO ORE ROASTED IN A HOWELL FURNACE.

Conditions Under which the Mill Tests Were Made.	By which Process Treated In Assay Office.	Per cent Extraction after 5 Minutes in the Furnace.	Per cent Extraction after 15 Minutes in the Furnace.	Per cent Extraction after 25 Minutes in the Furnace.	Per cent Extraction after 35 Minutes in the Furnace.	Per cent Extraction after 45 Minutes in the Furnace.	Per cent Extraction after 13-16 Hours in Vault.
16 Screen—8 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	81.6	80.4	64.3	64.3	64.3	64.3
30 Screen—7.5 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3
16 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3
20 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3

TABLE X.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, SOMBRERETE ORE ROASTED IN A REVERBERATORY FURNACE.

Conditions Under which the Mill Tests Were Made.	By which Process Treated In Assay Office.	Per cent Extraction after 4 Hours in the Furnace.	Per cent Extraction after 6 Hours in the Furnace.	Per cent Extraction after 8 Hours in the Furnace.	Per cent Extraction after 10 Hours in the Furnace.	Per cent Extraction after 12 Hours in the Furnace.	Per cent Extraction after 13-16 Hours in Vault.
16 Screen—8 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	81.6	80.4	64.3	64.3	64.3	64.3
30 Screen—7.5 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3
16 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3
20 Screen—12 per cent Salt added between Battery and Furnace.	Russell P. Ordinary.	80.4	81.4	64.3	64.3	64.3	64.3

b. Effect of Various Percentages of Salt on the Roasting.—In regard to the percentage of salt for Ontario ore and a Stetefeldt furnace, Table VII shows that either with a 16 or a 20 mesh screen 12 per cent of salt gives the best results. The tables do not show the comparison of results caused by different percentages of salt with a Howell furnace, but at Cusi the extraction in the assay office was not usually appreciably altered by any percentage of salt above 12 per cent, although as high as 16 per cent was tried. The Howell furnace used at Cusi were of cast iron, 23 to 27 feet long and 60 inches in diameter at the lower end; the lower end, for 6 to 8 feet, being lined with brick and the remainder of the furnace being either with or without shelves, and with or without one or two brick rings to retard the ore. Tables XII and XIII show the effect of various percentages of salt on the results of the furnace samples for Yedras or roasted in a Bruckner furnace. But in this case, also, Table XXVII shows a decrease of 7 per cent in extraction from the vault sample, as compared with the furnace sample.

As to the results of an oxidizing roast, the first two columns of Table VIII show the effect of such a roast in a Stetefeldt furnace on the results of assay-office leaching-tests for Ontario ore. Table XII gives the corresponding mill-results. The first section of Table XIII shows the effect of an oxidizing roast in a Bruckner furnace on Yedras ore. The second section gives the results obtained from the same charge 15 minutes to 1 hour after the addition of salt, and section 3, the final furnace-results. The results from the corresponding vault-sample would probably be 7 per cent less. The comparative applicability of the various furnaces in the preparation of ore for the Russell process will be considered later.

the effect of an oxidizing roast in a Bruckner furnace on Yedras ore. The second section gives the results obtained from the same charge 15 minutes to 1 hour after the addition of salt, and section 3, the final furnace-results. The results from the corresponding vault-sample would probably be 7 per cent less. The comparative applicability of the various furnaces in the preparation of ore for the Russell process will be considered later.

TABLE XI.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, YEDRAS ORE ROASTED IN A REVERBERATORY FURNACE.

Conditions Under which the Mill Tests Were Made.	By which Process Treated In Assay Office.	Per cent Extracted after 2.4 Hours in Furnace.	Per cent Extracted after 5.7 Hours in Furnace.	Per cent Extracted after 8.0 Hours in Furnace.	Per cent Extracted after 11.3 Hours in Furnace.
26-Screen.....	Russell Process.	72.5	78.2	87.0	90.0
Seven Per cent Salt	Ordinary	33.9	43.4	71.6	77.9
26-Screen.....	Russell Process.	72.5	78.2	87.0	90.0
Seven Per cent Salt	Ordinary	33.9	43.4	71.6	77.9
26-Screen.....	Russell Process.	72.5	78.2	87.0	90.0
Seven Per cent Salt	Ordinary	33.9	43.4	71.6	77.9
26-Screen.....	Russell Process.	72.5	78.2	87.0	90.0
Seven Per cent Salt	Ordinary	33.9	43.4	71.6	77.9
Average.....	Russell Process.	98.3	64.6	75.1	86.7
	Ordinary	36.5	39.1	58.0	67.9

TABLE XII.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, YEDRAS ORE ROASTED IN A BRUCKNER FURNACE.

Conditions Under which the Mill Tests Were Made.	By which Process Treated In Assay Office.	Per cent Extracted after 2.4 Hours in Furnace.	Per cent Extracted after 5.7 Hours in Furnace.	Per cent Extracted after 8.0 Hours in Furnace.	Per cent Extracted after 11.3 Hours in Furnace.	Per cent Extracted after 14.6 Hours in Furnace.
26-Screen.....	Russell P. Ordinary	78.4	83.2	81.5	88.7	70.9
Seven Per cent Salt	Ordinary	64.3	66.4	62.5	64.3	63.1
26-Screen.....	Russell P. Ordinary	78.4	83.2	81.5	88.7	70.9
Seven Per cent Salt	Ordinary	64.3	66.4	62.5	64.3	63.1
26-Screen.....	Russell P. Ordinary	78.4	83.2	81.5	88.7	70.9
Seven Per cent Salt	Ordinary	64.3	66.4	62.5	64.3	63.1
26-Screen.....	Russell P. Ordinary	78.4	83.2	81.5	88.7	70.9
Seven Per cent Salt	Ordinary	64.3	66.4	62.5	64.3	63.1
Average.....	Russell P. Ordinary	71.9	76.4	74.7	78.1	78.8
	Ordinary	49.4	44.4	44.6	40.1	38.8

TABLE XIII.

CHANGES TAKING PLACE DURING ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, YEDRAS ORE ROASTED IN A BRUCKNER FURNACE.

No. of Charge.	Description of Charges.	Value of Roasted Ore. Oz. Silver per Ton.	Per cent Extracted by Ordinary In Assay Office.	Per cent Extracted by Extra in Assay Office.	Per cent Difference Between Ord. and Extra in Assay Office.
1	26-Screen.....	65.8	40.0	74.3	25.3
2	" " " "	58.0	44.2	76.1	31.9
3	" " " "	57.8	40.3	70.5	30.2
4	" " " "	58.8	42.8	74.3	31.5

RESULTS OF OXIDIZING ROAST (BEFORE SALT).

1	26-Screen.....	65.8	40.0	74.3	25.3
2	" " " "	58.0	44.2	76.1	31.9
3	" " " "	57.8	40.3	70.5	30.2
4	" " " "	58.8	42.8	74.3	31.5

RESULTS ON ABOVE CHARGES IMMEDIATELY AFTER ADDING SALT.

1	After Add'g 7% Salt	61.2	50.1	79.2	29.1
2	" " " "	57.6	49.7	70.7	21.0
3	" " " "	58.3	40.3	82.3	20.5
4	" " " "	67.4	52.0	79.5	26.6

FINAL FURNACE RESULTS ON THE SAME CHARGES.

1	Total in F.—10 Hrs	61.1	52.7	74.0	22.2
2	" " " "	54.9	38.5	59.0	20.5
3	" " " "	58.9	54.3	74.4	20.1
4	" " " "	61.0	51.7	70.4	22.5

c. Effect on the Leaching of Wetting Down Roasted Ore while Red Hot.—The effect of wetting down roasted ore on the cooling floor while red-hot may be very injurious, as shown in the following statements, the first furnished by Mr. Frank Johnson:

SAN BARTOLO ORE, CUSI, MEXICO.

Value of Ore. of	Extraction		
	by Ordinary in Assay Office.	by Extra Solution in Assay Office.	
Oz. per Ton.	Per cent.	Per cent	
Before wetting down...	49.1	69.1	86.3
After wetting down ...	49.1	20.3	80.3

SIERRA GRANDE ORE, LAKE VALLEY, NEW MEXICO.

	Extraction		
	Value of Ore.	by Ordinary in Assay Office.	by Extra in Assay Office.
	Oz. per Ton.	Per cent	Per cent
Before wetting down...	16.0	81.5	87.5
After wetting down...	16.0	62.5	71.9

The above decrease in extraction by both the ordinary and extra solution is probably due to the reduction of some of the silver compounds to the metallic state by the steam formed by the red hot ore and water. No decrease oc-

cure unless the ore is red hot when wet down. Although the above tables give only the assay-office results, the effect on the mill results was approximately the same. Of the above ores, the first was acid, the second alkaline, and both were roasted in Howell furnaces.

The following statement shows the effect on the Sombrerete mill results of wetting down that ore while red hot, the ore being acid and roasted in a reverberatory and leached in charges of 4½ tons each:

Value of Ore.	by Ord. in Assay Office.	by Extra in Assay Office.	by Extra in Mill.
Oz. per Ton.	Per cent.	Per cent.	Per cent.
Average mill results on ore wet down while red hot.....	35.5	77.5	84.0
Average mill results on ore not wet down while red hot.....	36.5	74.0	80.3

In the above statement only the difference between the extra in the mill and that in the assay office should be noted. The other difference are probably not due to the wetting down.

That wetting down while red hot is not injurious on all ores is indicated by the following statement, although it refers only to assay office results. The ore is "alkaline arsenical," and was roasted in reverberatory furnaces. The difference in value may be due to a change in the lime compounds.

YEDRAS ORE, BINALOA, MEXICO.			
	Value in Ounces.	Extraction	
		by Ord- inary in Assay Office.	by Extra in Assay Office.
		Per cent.	Per cent.

d. Weighing and Charging the Ore into the Leaching Tanks.—For the success of the whole plant, as well as of the various leaching operations, the weight of ore charged into the leaching tanks must be accurately known. Otherwise, the cause of losses and discrepancies are not likely to be discovered. By weighing the ore into the leaching tanks, it is known at once whether the losses occur during the preparation of the ore for leaching or during the actual extraction of the silver and treatment of the product. For instance, at Cusi, in 1887, a loss of about 14 per cent was caused principally by dust, but, perhaps, partly by volatilization of the silver in roasting. That this loss occurred in the preparation of the ore, and not in the leaching, could not have been determined without weighing the ore between these two operations. On the other hand, if the weight of ore charged to the leaching tanks is determined by a merely approximate method, as by weighing only one cubic foot of a charge, much time and labor may be expended in searching for the cause of an apparent discrepancy, three-fourths of which may not exist. Aside from the question of the extent of the inaccuracy of this method, the fact that it is at all inaccurate is demoralizing, and discourages the making of comparative experiments on all subsequent operations. It is not exaggerating the importance of this point to say that upon the care used in weighing the ore charged to the leaching tanks often depends the success or failure of the whole plant.

The manner of charging now requires attention. As the proposed method of "trough-livification" does not do away with leaching tanks, but is merely a method of charging the ore into the tanks, a treatment of that subject will not be out of place here. In this method the ore is dumped into a trough (or first into an agitator) together with water or solution. The trough conducts the material to the leaching tanks. The result of using this method is a separating in the tank of the coarse and fine particles—the coarse particles sinking to the bottom, while a hard layer of impenetrable slime forms on the top, if one tank is used, and the order is merely reversed if various tanks are connected. When raw ore and tailings are thus treated, no amount of vacuum (up to even 20 inches of mercury) will cause a downward leaching; and if pressure below the ore is used, the liquid simply breaks a hole through the charge at the side of the tank. If water has been used in the trough or agitator, as would be necessary in the treatment of roasted ore, it is almost impossible to introduce the solution into the ore. If solution is used first, as for raw ore, this silver-bearing solution cannot be removed. It is true that, after the supernatant solution has been allowed to settle for a long time on the surface of the charge, that part of the solution can be decanted off, but this represents only a portion of the silver-bearing solution.

(To be Continued.)

ADELAIDE COPPER WORKS.—A. S. Bates, one of the owners of the Adelaide copper works near Golconda, Nev., says they have been delayed in getting iron ore for flux, but they hope to start up the furnace immediately and make a successful run, as they have plenty of ore at the furnace.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, July 28: At this mine they have cleaned out the sump preparatory to sinking. We believe it is the intention to sink 200 feet, and the work will be pushed to completion with all possible speed.

MISCELLANEOUS.—The cleanup of the Kennedy mine last month reached \$15,000, the best cleanup with one exception, since the present company took charge. The ore comes from the 750-foot level, which is turning out exceedingly well. A movement is being made to incorporate the Doyle mine, in Hunt's gulch. The papers will be made out the coming week. The development of a paying mine in that locality will be fraught with good for Jackson, and the prospects are favorable for the opening up of a solid mine by the expenditure of a few thousand dollars. The Huntington roller-mill at the Valparaiso, near Middle Bar, is running at intervals. It is found, however, that the ordinary mill process is not adapted to the rich rebellious ores of that district and a large percentage of the gold is lost no matter how carefully treated. The owners, Ginocchio Bros., are talking of putting up a small oven to roast the ore before crushing it. The mine is looking well.

SUTTER CREEK.—*Cor. Amador Ledger*, July 28: Sinking at the Wildman is progressing at an encouraging rate. Considerable quartz, said to be of a paying character, has been encountered. Sinking at the North Star is progressing satisfactorily. I believe the shaft is now down a distance of 575 feet. When a depth of 600 feet has been attained, cross-cutting will be in order.

Calaveras.

AROUND SAN ANDREAS.—*Calaveras Prospect*, July 28: The Union mine, about three miles out of town near the Angels road, is now being worked quite actively, and is under the management of Mr. Ricketts. Like most of the mines in this locality, the ore is of low grade, but with the good and ample milling facilities that it is provided with, it will undoubtedly pay its owners a fair margin over expenses. Twenty stamps are now being kept in active operation. The Thorn mine near this place, under the able management of P. S. Buckminster, is looking exceedingly well. Rich rock has been struck, giving great encouragement to its owners. About 15 men are employed, working night and day. The engine to aid in the further development of the mine is being placed in position. One by one the mines around San Andreas are opening, and each one gives greater encouragement for a mining boom in the near future. It is only a matter of time till the mining belt in our midst will be dotted with hoisting works and quartz-mills. Things have not looked so bright and encouraging as they do at present in many years. Improvements can be seen on all sides of us. Capital is slowly but surely leading toward us. A rich strike was made Tuesday in the Reed and Leonard quartz mine. After sinking about two weeks a rich body of ore five feet in width was struck about ten feet from the surface, the rich, pure gold showing itself all through the lead. The owners are highly elated over this rich discovery. Hoisting works will soon be erected and an engine put up. D. B. Reed of Table Mountain is one of the owners, and he is now superintending development. The Quaker Hill mine, near Chili junction, is being worked steadily under the superintendency of Mr. Ed Rigney. A force of men is putting the Mitchell mine in Vallecito in readiness for operations on an extensive scale. Some machinery was also brought upon the premises.

WEST POINT.—*Tuolumne Independent*, July 28: Quite a number of miners have arrived in Sonora during the last two weeks, from Calaveras. They hail from West Point, and report that town, which two years ago had a boom and was considered the pride of the county, as having gone down to nothing. Some ten mines used to be in operation day and night, while now none are working but the Lockwood, with a force of about 20 men; a year ago the same mine worked 150. Deserted mills are to be seen on every hand, their rusting machinery standing as monuments of a glorious past.

Nevada.

IDLE MINES.—*Herald*, July 28: Instances keep multiplying which show that gold-bearing ledges do not give out, entirely, either in quantity or quality. There are poor streaks in most ledges, but when further developments are made the original quality and quantity come in again. The North Star, the Empire, the Yuba, the Rainbow, the Providence, the Omaha and others, are instances sufficient to prove the rule. This rule holds good, at least in Nevada county. There are, in this immediate mining district, a half-dozen mines that have paid well in the past, but when a poor streak was encountered work was stopped and the mines allowed to stand idle. There is no sort of question but what these same properties, if thoroughly explored and sunk deeper upon, would again become productive. The trouble with nearly every one of such mines in this district has been that when they paid well the owners became extravagant and laid by none of the profits to cover emergencies. When the shoots pinched out they had no money to go ahead—became discouraged and shut down. There are half a dozen such mines within two miles of this city. They will be opened again some time, and the ones who open them will make money on the investment.

AN ORE BODY FOUND.—*Tidings*, July 26: A 12-foot body of ledge matter—talc and quartz stringers—has been uncovered at the New Eureka mine, in a crosscut 35 feet from the 300-foot level, in the foot-wall. This ledge, if it may so be termed, is identical with that in the Crown Point mine, adjoining on the southeast, is in picking ground and between smooth walls—greenstone slate on the south and serpentine on the north. The quartz and talc are highly mineralized. At this writing, however, the find has not been prospected. As the machinery on the mine is too light to meet the requirements of hoisting and pumping, the New Eureka will, in a short time, be shut down and a heavier plant erected. Then the shaft will be sunk an additional 100 or 200 feet and drifts and stopes opened. At this depth it

is believed the ledge matter above will be found as a solid quartz vein. Messrs. Weldman, Walrath and Skinner, the owners of the property, have expended a large sum in accomplishing what has been done. Should the New Eureka venture prove successful, these gentlemen have arranged for working the vein on a more extensive scale than this district has yet known.

BALTIC.—*Baltic mine*, Washington township, reported to have "struck it rich," having two feet of ore on the footwall that will mill from \$20 to \$25 a ton. The ledge is six feet thick.

GOOD PROSPECT.—*Tidings*, July 26: A ledge—size yet unknown—has been found in the west drift of the 300-foot level of the Brunswick mine. This will immediately be crosscutted upon. It was struck at a point 55 feet from the old shaft and the ore is the best appearing yet found by the new company, carrying sulphurets in quantity and of good quality, also other minerals. The value of the find will be demonstrated by the crosscut. Twelve men are employed at the Brunswick, and although the shaft has not been deepened, prospecting work has been actively pushed for months.

SALE OF THE EAGLE BIRD.—*Herald*, July 28: The Eagle Bird mine at Maybent has changed hands and will now be extensively worked. O. Newhouse will be the manager. His family went up to the mine to-day. The starting up of the Eagle Bird will be a good thing for the upper country and for the county.

Placer.

HIDDEN TREASURE MINE.—*Herald*, July 28: The Hidden Treasure mine is not an old mine, gravel having been struck in April, 1876. The mine, partly through good management and partly through the richness of the gravel, has paid well ever since. As the distance into the hill increases, the expense increases. The gravel is a white quartz, and its whiteness gives it a clean, bright appearance as one looks at it in the breasts. The deposit extends in nearly a northerly and southerly direction; its inclination is about seven feet to the mile. At present all the work is done on the eastern side. Gangways are run from the tunnel in that direction, and from them breasts are worked north and south. This is a continuation of the Amador slate, which here forms a belt six miles in width. The tunnel is timbered with the exception of 1000 feet, where it passes through hard cemented gravel. In some parts it is wide enough for two tracks, while in others the width is hardly sufficient for one track. This is caused by the nature of the rock, which swells with such force that strong timbers are broken. The direction of the pressure is upward. The swelling of the rock necessitates continual repairs. At one time 2300 feet of tunnel was retimbered. At present two shifts numbering 23 men are constantly at work putting in new timbers. This is deadwork and is a heavy item of expense. The track is of T rails weighing ten pounds to the running foot. The cars are drawn in by horses and hold a ton each of gravel. The usual output for 24 hours is 375 carloads. At this writing 45 white men and 105 celestials are employed. The whites receive from \$3 to \$3.25, according to the nature of the work, and the celestials are paid \$1.50. H. T. Powers has succeeded his father as superintendent and the shareholders and employees are well satisfied with his management. The gravel is paying very well at present. The system of ventilation is practical and keeps the mine supplied with good air. Parties entering the mine the day after the fire was extinguished found the air pure and wholesome, and men were put to work the evening of that day. The gravel is washed at the mouth of the tunnel, and a long run of sluices extending down the canyon prevents the loss of any appreciable amount of gold.

Plumas.

GRANITE BASIN.—*National*, July 28: Mr. Joseph Peppin informs us that the outlook for quartz mining in Granite Basin is better than ever before. Chatty & Co. are working very rich rock and are putting up a five-stamp mill, the machinery being on the ground. See & Jolly are working good pay-rock and will make a profitable summer's work. A lower country firm is putting in machinery to work the tailings from the different mines, and claim that they can be worked profitably. Granite Basin is coming to the front and bids fair to become a prosperous mining camp.

THE INDIAN VALLEY MINE.—*Greenville Bulletin*, July 25: Very good work is now being done in this mine. Two developments have lately been made in the Blood tunnel at points where it was generally supposed that no quartz of value existed. The ore extracted is being milled, with very satisfactory results. Mr. Prentiss informs us that more ore per stamp is crushed daily than ever before. He thinks it may become necessary for him to put on more cars to keep the mill supplied with quartz.

Shasta.

THE NIAGARA MINES.—*Shasta Courier*, July 28: The group of mines owned by the Niagara Mining and Milling Co., French Gulch district, is one of the finest mining properties in the State. It embraces 18 locations on good free-gold ore, and Government patent secures the title. On the ground is an 18-stamp mill, batteries and all the appliances required to work a great mine. A commodious boarding and lodging house for the workmen, blacksmith shop, etc., is there, and as good a complement of practical and efficient miners and millmen as can be found anywhere take pride in holding situations on these works. Supt. James Sutherland, like Supt. John Sutherland before him, is a thoroughly practical man, well fitted for the place he occupies, and every person at the works respects and likes him. That the Niagara mines and mill have contributed greatly to recruit the gold output of the State is known; that there are millions of dollars still to be taken from the Niagara group of mines is undoubted—in fact, assured—by what has been accomplished. The displacement of the old works that have been used, by a new plant of machinery, indicates that business will "hum" in a more lively manner than has ever been heretofore known in French Gulch district.

FROM IGO.—*Cor. Shasta Courier*, July 22: C. J. Russell is digging a ditch to take water from near the head of Eagle creek. He is going to put in machinery of some kind to work his Centennial ore. E. L. Ballou is running his large pile of tailings over a Shaw concentrator. It is also regrinding a portion of the same in his astras. Shirland Bros. have just finished a run of ore from the Live Oak, and are now crushing Pacific ore. Ledge looks well. P.

Gibney is doing some work on his claims. He has a good showing of low-grade ore in large quantities. Briggs & Kitchen have been prospecting in Kanaka, with indifferent success so far. J. P. Wright is running his lower tunnel to extract sulphurets ore for shipment. D. F. Bennett has found a body of free-gold ore on the Red Warrior. A test of the same in Wright's astras was quite satisfactory. Water is holding out well this summer.

CINNABAR.—Elisha Dack came down from the Dack cinnabar mines above Trinity Center a few days ago and will take his family from Andersonn up there to spend the summer. The works are in operation, and the Lost Confidence mill on Iron mountain uses up all the quicksilver that can be brought down. At present, the flasks have to be packed on mules, 12 miles over a rough trail to Trinity Center, which is slow work and tough on animals.

SEAM DIGGINGS.—John H. Stowell was down from Copley Wednesday, and from him we learn that Bob Trimble and Jim Murphy have struck good pay in the shape of seam diggings about 100 yards south of the Copley section-house. The gold is found in decomposed quartz. It is probable that there are other rich seams in that vicinity, as the gulches about Copley all paid well when worked years ago—in fact, they paid when worked the second time.

Sierra.

QUARTZ.—*Mountain Messenger*, July 28: Paul Meroux and Val Harting discovered a rich quartz ledge up the East Fork last week. A location has been made.

POKER FLAT.—Louis Cook was over from Poker Flat last Saturday and reported a good prospect in the Nevada City quartz ledge at Little Grizzly—decomposed ore, six feet wide. In early days quartz gold in \$100 and \$1000 pieces were found in the gravel over this ledge.

RICH ORE.—M. Lawler of American Hill has recently struck a fine body of rich ore in his ledge with the tunnel which he has been running since last fall. Gold is visible in nearly all the rock and the vein is about eight feet wide. He has tapped the ledge full 100 feet below the surface and is assured of a very valuable property.

Tuolumne.

RESUMED OPERATIONS.—*Union Democrat*, July 28: After several weeks of inactivity the Buchanan mine has resumed operations again. The mill, however, is not in operation, owing to a lack of water. Paul Morf, from his mine at Mt. Elizabeth, reports considerable progress and says that should the lead hold out in its present prospects and dimensions, he will be more than satisfied. G. A. Fischer of Tuttle town has opened the Leonard mine, which is but a short distance above and to the west of the Patterson mine. He has cut the vein in two places and in one of them the lead is about six feet in width and is considered to be splendid milling ore. Harry Kirke was in town this week from the Pine Nut mine of Dr. J. Walker, on Turnback creek. He and Mr. Fitzgerald have been opening the mine for some time, and it now looks remarkably well. It is reported that the mine of Mr. Geo. Mapes on Yankee Hill is looking fine and in all probability it will develop into a big property. Almost daily there are passing through Sonora loads of machinery for the Eureka Consolidated mine at Summerville. A 20-stamp mill from El Dorado county is to be erected there, and it is largely this machinery that is being forwarded. The mill will be erected as early as possible. Judge Philip Stoner and Dr. Tibbet of Columbia have struck it rich in their claim at Yankee Hill. These gentlemen have, for the last six months or more, prosecuted the sinking of the shaft with more or less variation in result, until last week, when a splendid body of ore was reached. We understand that the Lane mine at Dickson's ranch, a mile from Sonora, is improving as depth is attained. The main shaft is now down 85 feet and the quartz looks exceedingly well. Water, however, is coming in quite freely. This has necessitated the erection of an engine, and one of 10-horse capacity is being placed in position. From Joseph Hampton, who, in association with Wm. Long, is working the Cardinell mine at Tuttle town, we learn that a prospect has now come in the winze which they are sinking in the north drift. Should a chute or deposit be discovered, which now appears to be within the probabilities, it will no doubt be a bonanza, as the early workings of the chutes of this mine yielded about \$300,000. On or about the 12th day of last month the Colorado Mining Co. recommenced operations on the Tuolumne river at a point about two miles above the famous river claim of J. R. Moffit at Moffit's bridge. The company employed 20 men and directed their operations to the turning or deflecting of the river. Excellent success was had until the latter part of last week, when the rains in the mountains raised the river and necessitated the temporary withdrawal of the force. However, on Tuesday of this week the river had so far subsided as to permit a resumption of operations. The present works will drain about 1300 feet of the river-bed. Two breast wheels and probably a third one will be placed in the river for pumping-power. This large undertaking is under the management of Messrs. E. R. Cody and H. W. Keith, who expect to reach and commence on the gold strata about the 15th of next month.

SUMMERVILLE.—*Tuolumne Independent*, July 28: Summerville is having a lit le boom, while the prospects are good for its growing. Freight teams pass through Sonora almost every day, carrying mining machinery and necessities, the major portion of which is for the Eureka Co. Prospectors swarm over the hills, the village is full of strangers, evidences of business enterprise are to be seen on every side, the gold fever is on, and Summerville may yet, as she did in days gone by, stand on top of the heap.

NEVADA.

Washoe District.

CHOLLAR.—*Virginia Enterprise*, July 28: On the 650 level the north raise is in ore of a fair-milling grade. The face of the north drift on the 450 level continues in low-grade quartz. All is in readiness for starting up the 20 stamps that are to be run by electricity, but the dynamo and motors have not yet arrived. Only 20 stamps are at present in operation at the Nevada mill, and these are running on Hale and Norcross ore. It seems that now that

the California mills have been started up there is not enough water to run more than 20 of the 40 stamps at the Nevada mill.

CON. CAL. VIRGINIA.—West crosscut No. 2, from the north drift from the north end of the stopes on the 1500 level, is still in ore of a fair quality. The southeast drift from the north upraise from this level is passing into quartz that shows value. The southwest drift from the upraise from the 1650 level is yielding some good milling ore. Sixty of the 80 stamps at the California battery-mill were started up last Thursday, with a suitable proportion of the amalgamating apparatus at the pan-mill.

HALE AND NORCROSS.—On account of the scarcity of water at the river, are not yet working more than half the usual quantity of ore. The ore extracted is of better grade. The usual dividend will be paid. The stopes throughout the mine continue to look well. Twenty stamps of the Nevada mill are being run on ore from the mine, also half the stamps of the Mexican mill on the Carson river.

WEST YELLOW JACKET.—The drift 60 feet below the surface has cut a feeder of quartz about 20 inches wide, from which assays as high as \$112 a ton have been obtained, 80 per cent of which was in gold. This mine is situated west of the town of Gold Hill, on the north side of Crown Point ravine, near the Ophir grade.

BELCHER.—On the 500 level a crosscut is now out 122 feet. A good deal of repair work has been done to the engines, etc., at the old shaft. The buildings at that point are now all about completed. Good progress is making in the connecting drift coming from the Sutro tunnel.

OCCIDENTAL.—Extracted 126 tons of ore and shipped to the Atlanta mill 150 tons. Average assay of wagon samples, \$30. Shipped bullion to the San Francisco office of the assay value of \$4400.66, and have on hand in the assay office in this city bullion of the value of \$1500.

POTOMAC.—On the 650 level the south drift is out 260 feet. The total length of the south drift on the 550 level is 690 feet. The drift is still in quartz that yields fair assays. On the same level east crosscut No. 2 is out 105 feet, and is passing into a mixture of quartz, clay and porphyry.

GOULD AND CURRY.—During the week there has been extracted from the 250 and 300 levels and shipped to the Douglass mill 243 tons and 300 pounds of ore. The average battery assay is \$23.54. Shipped to the San Francisco office bullion of the assay value of \$4514.12.

CONFIDENCE.—A raise joint with Challenge is being made from the 1200 to the 1100 level. Daily shipments of about 175 tons of ore are still being made to the Brunswick mill. A good deal of repair work is in progress in all parts of the mine.

SAVAGE.—Are extracting about 50 tons a day, which is being shipped to the Rock Point mill. More ore would be extracted but for the low stage of the water in the Carson river. The usual amount of prospecting is in progress on the several levels.

IOWA.—Have completed arrangements for opening a level from the main shaft to develop the Moscow or red ledge at a greater depth than that to which it has been stripped by the south drift from the McBee tunnel.

ALTA.—The stamps and concentrators are running steadily and the usual amount of ore is being mined on the 825 level. The machinery at the Keystone shaft will start up about August 1st.

EXCHEQUER.—The face of the northwest drift on the 122 level continues in quartz of favorable appearance. On the 222 level the face of the east crosscut is in quartz and porphyry.

LADY WASHINGTON.—Good progress is being made in the northwest drift on the 725 level. Expect that it will cut the Keystone vein in going a farther distance of from 30 to 40 feet.

BEST AND BELCHER.—El Dorado level: The main northwest drift from the main west drift has been extended 53 feet; total length, 527 feet. Formation, porphyry and quartz.

YELLOW JACKET.—Owing to the low stage of water in the Carson river, no ore is being shipped. The principal work now being done is in the way of repairing and prospecting.

BALTIMORE.—The pumps are working well, and the usual prospecting work is being done on the 300 level. Some streaks and bunches of good ore are being encountered.

CROWN POINT.—On the 600 level the north drift is being advanced into quartz showing some ore. On the 700 level the crosscut is still in streaks of clay and quartz.

SEG. BELCHER.—Work in the upraise from the 1300 level is progressing favorably, and streaks and bunches of ore of a fair grade are being encountered.

OPHIR.—Good headway is making in retimbering the surface portion of the shaft, repairing gallowframes, etc.

UNION CON.—Are awaiting the completion of repairs to the Ophir hoisting frame to resume explorations.

SIERRA NEVADA.—West crosscut No. 1 on the 250 level is still in a mixture of quartz, clay and porphyry.

BULLION.—Fair progress is being made in the main south drift from the bottom of the 640 level winze.

MEXICAN.—Mining work suspended pending the completion of repairs to the Ophir hoisting works.

CHALLENGE.—A raise joint with Confidence is being made from the 1200 to the 1100 level.

ALPHA.—Good headway is making in sinking and timbering the main shaft below the 380 level.

ANDES.—All is going on about as usual in the prospecting drifts of the 240 and 350 levels.

CON. IMPERIAL.—Making repairs in the main north lateral drift.

BENTON.—Some prospecting is being done on the 725 level.

Buel District.

TO BE REWORKED.—*Cor. Reno Gazette*, July 24: Buel Mining District is situated about five miles from Tecoma station, on the south side of the Central Pacific railroad. The Nevada and Utah line runs through the district, the western part in Nevada and the eastern part in Utah. This district is another of the old discoveries, and after considerable preliminary and well-directed prospecting was done

resulted in opening out some small bodies of pay ore. Of late a Salt Lake company has been working the principal mines, but with what results I am not informed. The formation is soft and easily penetrated. The ores of this district are chiefly galena, carrying some copper. The low ruling rates of copper and lead heretofore, together with the depressed condition of the silver-bullion market, has given but little encouragement for the resurrection of this district. Fair prices for its production and good management in the mining and reduction of its ores to bullion, would bring this once well-to-do camp to the front as a silver-producing district.

Delano District.

AN OLD DISTRICT.—Cor. *Reno Gazette*, July 23: Some 20 miles northwest of the Central Pacific railroad, from Tecoma, is situated the Delano district, which was discovered and organized during the early days of prospecting. Quite a number of ledges were located, but not sufficient work to determine the prospective value of the claims was performed. There were, however, a few carloads of ore extracted, sent and worked at Salt Lake City, from which the owners realized good pay, but by the time the heavy cost of transportation by train to the railroad, thence to Salt Lake by car, including other incidental expenses, as well as the cost of reduction, were met, little was left for the mine-owners, and therefore this mode of operation was abandoned. The major portion of the ore is of a galena character. This district, like others of its kind, was given up and abandoned by the miners, wood and water both being scarce. The district is in the most northeasterly portion of Elko county, near the Utah and Idaho lines, bordering on Thousand Spring Valley on the southwest, and is not far from the Goose Creek range.

Pioche District.

THE YUBA MINE.—Pioche *Record*, July 28: Development work at this mine goes on steadily; the quantity and quality of ore uncovered the past few months is most gratifying to the owners. The property is generally known as the old American Flag mine and was worked in the early '70's for milling ore, the main shaft then reaching a depth of about 200 feet. As depth was attained the ore changed in character to lead or smelting ore, of a grade which at that time it was unprofitable to mine, and work was suspended. The claim was afterward forfeited and relocated and was purchased by the present owners last April. Before the sale the property was under bond for some time, during which the shaft was reopened to the ninth level where the vein of base ore formerly abandoned was found. The vein is a contact fissure following a dyke of porphyry. Two separate and distinct veins of ore are now uncovered, both lying north of the shaft. The first and main ore body, which was reopened on the eighth level, is a base sulphuret, assaying well in silver, however. This vein on the ninth and tenth levels has been developed for a distance of about 100 feet east and west, and by stopes and winzes is shown to extend to a depth of about 300 feet from the eighth level. It is believed to extend to still greater depth and the work of cleaning out the shaft to the twelfth level is now in progress. This ledge now opened carries ore averaging 10 width from 1 to 8 1/2 feet, which is divided into two classes, the first class averaging 90 ounces and the second 45 ounces in silver per ton. About 15 per cent zinc is contained in the ore in this ledge, which renders it difficult and expensive to treat. The second ledge opened is on the eighth level about 25 feet north of the shaft. Developments are here made for 40 feet east and west showing a vein of ore averaging one foot in width. The character is a mixture of smelting and free-milling ore, the latter character predominating. The former carries 200 ounces and the latter 70 ounces in silver per ton. Of the ore extracted while prospecting the above developments, a portion of the better grade has been shipped to the Salt Lake smelters; the remainder lies in the ore bins and on the dump at the mine. The present work is exploration work merely, prosecuted solely to determine the extent of the ore bodies, and but 18 men are employed in all.

Tuscarora District.

NAVAJO QUEEN.—*Times-Review*, July 28: North crosscut, 200-foot level, advanced 17 feet. Have increased the force and will make better headway in the future.

NEVADA QUEEN.—The 450-foot level has been extended 24 feet, the ore extracted being high grade, the face still to ore, two feet of which averages \$450 per ton. There is quite a flow of water coming in through the face. The stopes above the 350-foot level range from 5 to 18 feet wide, and show well the entire length, there being very little waste. South, they extend to the North Belle Isle line; north, the ore still continues as the stopes are opened up. During the week 70 tons were extracted averaging over \$200 per ton, and 180 tons of concentrating ore, average assay from car sample \$26 39-100 per ton. The south drift, 90 feet below the 300-foot level, is exposing high-grade ore.

GRAND PRIZE.—East drift, 200-foot level, extended nine feet, and west drift, same level, 17 feet, both faces showing a good vein of ore. The stopes above this level are looking and yielding well, the upper ones showing chloride ore assaying as high as \$1000 per ton. The 300-foot level stopes are running out well both as to the quantity and quality of the ore. The mill was started up last Monday morning, is running all right and doing good work.

FOUND TREASURE.—The stopes are producing the usual quantity of high-grade ore. A 10-inch steam pump will be placed in the shaft during the coming week.

NAVAJO.—North drift from No. 2 winze on east vein, 250-foot level, extended 12 feet; the face shows some good ore. The stopes are yielding as usual.

NORTH BELLE ISLE.—Work has been suspended for the present on the 70 and 150-foot levels. Good progress is being made on the concentrating works.

BELLE ISLE.—East crosscut from north drift, 250-foot level, extended 10 feet. The face shows more favorably. The stopes are yielding as usual.

COMMONWEALTH.—The east lateral drift from main south drift has been extended 13 feet; the ore continues high grade. No. 1 winze from main south drift has been sunk 13 feet; total, 37 feet. The ore has been good all the way down and still shows well in the bottom.

Silver Zone District.

MAY BE PROSPECTED.—Cor. *Reno Gazette*, July 24: Silver Zone is situated some 25 miles south of Toa-

no on the Steptoe range. The formation is lime and granite. The ores of the district carry silver and copper, and at the time of its discovery, some 16 years ago, good paying prospects were obtained from several of the ledges, but as the holders of these claims were poor men and they were unable to call the attention of the capitalists, the district was finally abandoned.

ARIZONA.

SUCCESSFUL RUN.—*Prescott Courier*, July 28: Miners of Big Bag and Walker districts who have called at this office assured us that, in their opinion, the Van Name mill was making a successful run. Hope so, for if we are not woefully mistaken there are hundreds of tons of ore ready for it on dumps and thousands of tons in the mines. Success would be greatly relished by us, for the sake of the miners, the country and the mill-owner, Wm. Van Name, who is a high-grade man. Fred Smith was here yesterday from head of Hassayampa creek, where J. W. McGowan, superintendent of the Senator, has about 30 men getting out timber, putting up machinery, etc. The camp is about 8000 feet above sea level. O. F. Place, superintendent of the Moody and Place, is on his way back to his mines. He is building a mill. Messrs. Engle and Cooper have discovered a ledge near Bishop's station, a few miles east of Prescott, top rock of which sampled 68 ounces to the ton in silver. They are workers and will take out plenty of ore. The vein is 18 inches thick. Our Tip Top mining friends are preparing to return home. They are the boys that dig out silver ore that goes from \$50 to \$1000 per ton. Nothing less than \$1000 ore will pay in that district. While our miners are O. K., it grieves us to have to say that most of the mills and things that have been erected here to work the ores have not done so successfully, and were it not for the railroad and the ore sampling works, but little bullion would have been taken out in the past year.

MILL RUNNING.—*Prescott Journal-Miner*, July 25: Chas. A. Girdler is now running the Etta mill. The mine has been closed down temporarily, as difficulty has been experienced in saving the gold. The mine is said to look better at present than ever before, there being five feet of good ore at the lowest workings.

NEW DISTRICT.—Sam F. Powell has recently discovered a new district south of the Walnut Grove dam which he has named the Black Dog district, and which promises to come into prominence at once if the surface croppings are any guide. One claim, named the Thompson, located by Sam F. Powell, W. W. Vanderbilt and Chas. Thompson, has a ledge 18 inches wide, which sampled across its entire width \$594. It is rich in horn silver, and picked specimens from it run away up into the thousands. While prospecting in the same vicinity, Powell also ran across some very high-grade lead croppings sticking away up out of the ground and made 12 locations. On one, called the Lead Chief, he can walk on the croppings for a distance of 500 feet, the ledge being four feet in width and the ore being a beautiful fine-grained galena, assaying 77 per cent lead and \$46 in silver. A number of the other claims located show ledges varying in width from six to ten feet and the ore assaying from 17 to 48 per cent lead and running well in silver. He also located two claims which are very rich in copper ore. The district is close to the proposed route of the railroad, and the discovery has created a great excitement in that section. Mr. Vanderbilt, who is a partner with Powell in these claims, has forwarded a load of tools and supplies to the camp and will commence at once to prospect the claims, being sanguine of obtaining good shipping ore from the very surface. The samples brought in are all fine smelting ore, and there is abundance of both water and timber in the immediate vicinity.

WATER SCARCE.—Two men are making good wages out on Lynx creek by packing water on four burros for a distance of two miles with which to wash out gold. They pack ten gallons to each animal at a trip, making from two to three trips per day. There is no better evidence of the richness of the gravel than the fact that by this crude method they are able to make excellent wages. Louis Johnson was up from Tip Top yesterday with a shipment of ore to the sampling works, from the Fourth of July mine, owned by him and Thomas Wade. This mine has produced thousands of dollars already, having been formerly worked by B. C. Williams. The ore runs some \$600 or \$700 in silver.

SHIPPING ORE.—Tip Top miners are shipping their ore now to the Prescott Sampling Works. While they are not able to realize quite as high a price for the ore, owing to the mountainous roads between the two points, they have the advantage of getting spot cash for it here, while in shipping via Phoenix they are compelled to wait from 30 to 60 days to get returns. W. B. Long, superintendent of the Oro Bella Company, says both properties which his company are working—the Oro Bella and Oro Bonito mines—are developing very satisfactorily.

BRITISH COLUMBIA.

IS IT ANOTHER EL DORADO?—Donald Truth, July 27: Along in the 60's, shortly after the discovery of the rich diggings on Wild Horse creek, in the lower part of this county, adventurous prospectors penetrated this region and searched for gold on Quartz creek, but met with indifferent success. In 1885, during construction times, a number of out-fits went in from the Beaver, some of them working all summer. Billy McVeigh, Cassiar, three of the discoverers of the new find, and others now residing in Donald were of the number. Considerable work was done and gold taken out, but the ground was for the second time abandoned. Early this spring two men went over to the creek, but the snow was too deep and they had to return. Later, Harry Lowell, G. B. Nagle, Raymond Allen and Tom Horn, all old-time prospectors, packed in some grub and began prospecting the creek and its branches. In the forepart of this month they made a discovery on Porcupine creek, a tributary of Quartz creek. They report taking out \$1.70 worth of dust an hour to the mao for the short time they worked, one nugget weighing over 50 cents. The creek-bed is from 150 to 200 feet wide, with gravel banks carrying coarse gold. Bedrock is reached in from 4 to 6 feet, with but few large boulders interfering. There is about 75 miles of water with which to work

the 6 miles of ground, it prospecting good for the entire distance. It is safe to say the diggings are worth over \$6 a day to the man. These gentlemen intend to put in a bedrock flume to work their ground. At present they are engaged in cutting out a trail so that the creek can be reached from Donald, the present trail from the Beaver being too roundabout. Porcupine creek is about 25 miles from Donald, and parties of two and threes have already started in, going by the way of the Beaver.

ILLE-ILLEWART.—Donald Truth, July 28: The men employed on the dump at the Lanark mine struck for higher pay on Thursday. They were immediately paid off and discharged, their places being filled by men from the railroad. The Skirk Mining Co. shipped two carloads of high-grade ore to San Francisco this week.

FIELD.—The English syndicate who purchased the Coffman Tunnel mountain mines last spring have commenced operations by erecting a boarding-house and other buildings necessary for development work.

TOBY CREEK.—A number of prospectors have taken up locations on this creek and are doing assessment work. The claims are said to look and promise well. The district is on the west side of the Columbia about 35 miles above Jubilee.

COLORADO.

WORKING.—Elk Mountain *Pilot*, July 28: Work has been resumed on the old Painter Boy mine, Washington gulch. The Augusta tramway is again in place and ore from this mine is coming down. The Daisy mine in Redwell Basin shipped three carloads of ore last Tuesday to Denver. Last week three carloads were shipped, and in fact the mine has shipped three carloads every week since it has been shipping this summer. This is remarkably good for a mine that is only employing two men. The ore from this mine runs over 50 per cent lead and free from zinc, which makes it a desirable smelting ore. A. L. Horner of St. Louis, Capt. E. W. Burton and W. J. Fine of Gunnison are up Washington gulch this week inspecting the Painter Boy mine and also the placers. There are prospects of considerable work being done up there this summer. The miners of Yule creek are about to have a road built from Slate river over to their mines. Geo. L. Brown, Alex. and John Harvey of Leadville have been over here for several days looking after some mining claims belonging to them, situated on Cement creek. They are working a small force of men at present, and should an ore body be opened up to give sufficient encouragement, they will do considerable more work.

DAKOTA.

SUCCESSFUL TEST.—Deadwood *Pioneer*, July 24: The Hartsfeld smelter started up at nine o'clock Saturday night and shut down at nine o'clock last night, having run just 48 hours, and having produced a ton and a half of bullion valued at about \$500; \$360 silver and the balance in lead. This resulted from 16 tons of ore furnished by the Bullion and Merritt mines, the Bullion furnishing two tons to one from the Merritt, the latter ore carrying a greater per cent of lead. The run was better than anticipated. The promoters of the undertaking realized they had many obstacles to overcome, many difficulties to contend with. It was stated, and perhaps truthfully, that a Hartsfeld smelter of five tons capacity might be found in every mining camp of the West, and that not one of them had ever proved a success. Last year's failure with this was referred to. Such critics did not, however, consider that W. B. McPherson and J. A. Short had almost entirely remodeled the plant, doubled its capacity, added a lead well and water jacket, and otherwise improved upon it in various ways. The gentlemen deserve credit for the work and are to be congratulated upon the success it has met. The run was a test upon which much depended.

IDAHO.

DEADWOOD BASIN.—Boise *Statesman*, July 25: Mr. I. C. Hall is in from Deadwood Basin and reports that they will have the Deer creek ditch completed and water turned in this week. They have used a ton of giant powder in blasting bedrock this spring which they did not anticipate would trouble them. They have worked 25 men on the ditch this season. The heaviest work was done on the ditch last fall. It is 8 miles long and will carry 2000 inches of water. The diggings under it have been thoroughly prospected and are known to be good. Mr. I. C. Hall, his brother L. P. Hall and friends in New York took hold of this work last summer, and they will spend \$50,000 before they will be able to make returns from their placer mines. Mr. Hall says the quartz mines in that vicinity are large and rich. What they need is a wagon road to reach the camp.

A GOOD STRIKE.—Wood River *Times*, July 25: K. H. McLeod, foreman of the Silver Fortune group of four mines, up the east fork of Wood river, was in Hailey to-day, getting samples of a new strike at his claims assayed. This strike consists of an 18-inch vein of solid steel galena, which was cut into last evening, on the Oregonian, one of the claims of the group. The property has heretofore been considered a low-grade proposition, the ore having only averaged 82 to 83 ounces silver and 68 per cent lead; but this new strike promises to be of much higher grade. The strike was anything but a surprise to the parties interested, as they had been expecting to find ore for some time past.

NEW MEXICO.

PEERLESS.—Silver City *Sentinel*, July 24: We are reliably informed that the Peerless Mining Co. have leased their property to Andrew Stewart, Esq.

IN BONANZA.—The Silver Belt, Santo Domingo gulch, Pinos Altos district, the property of McKnight & Co., at 40 feet in depth is in bonanza. The ores are heavy sulphurets of copper, galena, with some zinc. The work up to the present has been confined to development only.

OREGON.

THE CRACKER CREEK MILL.—Bedrock *Democrat*, July 23: Mr. Donaldson, superintendent of the Eureka and Excelsior mine, in Cracker Creek dis-

trict, has contracted for 110,000 bricks, to be used in constructing the furnace of the new mill soon to be in operation there. The brick will be manufactured near the mine. The mill will be in successful operation, it is said, within the next 65 days.

MORE EVIDENCE.—Mr. J. H. Bacon returned yesterday from a visit to the Cracker Creek district, bringing with him a most cheerful account of the outlook over there, and some as nice specimens of gold sulphurets as one could wish to look at. Cracker Creek is alive with strangers; some mining, some prospecting and some building towns. Its growth as a camp will not be phenomenal, but it will be steady, and as the mines are there to warrant a heavy yield, the chances are that it will always be a good and lively camp.

NOTES.—Jacksonville *Times*, July 26: Considerable mining is now being done in Silver creek district. The Sterling Co. is still pining, but will commence cleaning up before long. Geo. Jensen and Jacob Klippel are now prospecting the Col. Irish ledge, from which such rich ore was recently obtained. Desselles & Connell, proprietors of the Scotch gulch mines, near Waldo, made their final cleanup recently and did well. Chas. Agee, who has a claim not far from Kerbyville, took out several hundred dollars, notwithstanding the unfavorable winter. Henry Klippel, Thos. T. McKenzie, Jesse Simpson and others are prospecting on Applegate, and think they have struck a big thing. Thibau Bros. of Ashland precinct have returned from a prospecting trip to the vicinity of the Three Sisters, where they obtained some excellent ore. Less than 1000 pounds of quartz from the Col. Irish ledge in Willow Springs precinct was crushed in Sanderson Smith's mill near Gold Hill last week, from which \$116 was obtained.

UTAH.

REVIEW.—Salt Lake *Tribune*, July 28: Last week saw the stoppage of the Germania smelter; this has seen the stoppage of two stacks of the Mingo; the Hanauer producing about as usual, with some uncertainty whether it will follow the example of the others or not. The cause of shutting down is the unsatisfactory freight-rates. Other causes, however, have been in operation since the drop in the lead market, as the short ore supplies, some of those mining operations which can afford it, holding their ores, and of those who cannot afford it, leaving the ores in the mines. The shipments out from this city for the week ending Saturday, July 21, inclusive, were 1,829,832 lbs., being an unusual quantity of ore. It would be interesting if we could have returns of the yield of this ore sent away, compared with the result when smelted in this valley. The product of the Ontario for the week was \$875.23 from ore sales and of bullion, 27,251 fine ounces; an approximate value of \$29,402.23. The Daily output for the week was 9605 fine ounces of bullion and \$9948.82 from ore sales; a total, approximately, of \$19,553.82. The Horn Silver makes no local showing; probably it is doing next to nothing. Fine bar receipts in this city for the week were to the value of \$47,356; base bullion, \$8500. The Hanauer smelter produced during the week, bullion valued at \$18,000. Ore receipts in this city for the week were to the value of \$14,960 by Wells, Fargo & Co.; \$14,400 by McCormick & Co.; and \$7709.83 by T. R. Jones & Co.

PARK NOTES.—Park *Record*, July 28: At the place where the new three-mile drain tunnel for the Ontario will be started the buzz and hum of activity continue. Ground at the tunnel's mouth will be broken in a few days. Work is still going on in Hoyt's Wasatch ground and ore shipments will be resumed soon. James Moray is pushing his Walla Walla tunnel above Lake flat, and it is in about 1500 feet. John Green is driving a tunnel on the Barrios group, on the flat, to strike the discovery ledge.

IN EMPIRE CANYON.—The West Ontario consolidated shaft is down about 560 feet, but sinking has been stopped temporarily on account of the flow of water. Farish & McLaughlin believe that when the Anchor tunnel gets through it will tend to drain their shaft. The large air compressor at the Massachusetts has been started up, and about the middle of the coming week the power drills will be set to work drifting from the 600-foot station.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 260,000 pounds of concentrates; no first-class ore. For the week just ended the Mackintosh sampler received 34,220 pounds of Ontario ore and 432,820 pounds of Daly ore. Last Tuesday the Ontario shipped 41 bars of bullion, containing 19,126.77 fine ounces of silver.

CAMP CROSSCUTS.—The 14th regular monthly dividend on Ontario stock will be payable on Wednesday. It is of 50 cents a share; aggregates \$75,000, and brings the total up to \$945,000. The Marsac mill after undergoing a thorough overhauling and repairing, occupying two weeks, started up last evening.

ALONG BONANZA FLAT.—Smith Ehenger is pushing work in his No. 3 tunnel, west of the Anchor, with favorable results. Geo. Pierson has resumed work on his Red Oxide tunnel on Pioneer Ridge; it is in some 300 feet. Four men are working in the Lucky Bill. They are running the tunnel to cut the ledge.

OVER IN SNAKE CREEK.—Another rich discovery has been made to the Southern Tier group. No work is at present being done on the Black Diamond, but Manager Pierson believes that the Board of Directors will order developments to be resumed shortly.

WASHINGTON.

MINING OUTLOOK.—Colville *Miner*, July 26: Contrary to what many would suppose from the reports that go out from this section of country, there is a remarkable activity in mining in this district. Several purchases of good property have been made in this district, especially in Clugston creek, where the lead prospects have been very largely developed and where considerable work is going on in the camp. The Old Dominion is being worked with renewed vigor, and weekly shipments of the ore, which is very rich, are coming in in large quantities to Eastern markets. The Chewelah district is proving of much more promise than heretofore, the output being of such a character of ore that shipments will be made therefrom the same as from the Old Dominion. The general nature of the mining interest is by no means deteriorating.

MECHANICAL PROGRESS.

Forging by Pressure or by Blows.

Very many forging presses are now in use for making large and heavy pieces, and the relative effect on the work is thus summed up by Prof. Kick, who has published in the *Technische Blätter* an interesting account of the experiments he has made on this subject. The difference between static pressure and that which results from a shock consists, he says, in the duration of their action. The weight of the hammer and the height of the fall determine the total energy expended, but the power of the shock for a given expenditure of energy itself depends on the compression produced in the object struck. The feeblest this compression is, the greater is the relative force of the blow to the pile. He has made some comparative experiments between the effects produced by an ordinary pile-driver striking upon an anvil solidly fixed, and by a ballistic hammer, or one where the driver and anvil are both suspended like pendulums, so that the anvil is free to move. He has found that within rather large limits the work employed in the deformation of an object under the action of the shock only depends upon the product of the weight of the driver and the height of the fall for heights varying from 0.50 to 3 meters. The test pieces were small copper cylinders, fitted on the same rod, and of the same initial dimensions, 16.9 mm. long, 12 mm. in diameter, and weighing 18.4 grammes. One of the series has been submitted to the action of an ordinary driver, and the other to that of a ballistic driver, taking care to obtain equal shocks under the two conditions. The weight of the anvil of the ballistic driver was to that of the driver in the proportion of two to one. The experiments have shown that a greater deformation is obtained by the ordinary than by the ballistic drivers, all other things being equal. With the latter, a calculation of the proportion of force transmitted to it can easily be made, and it was found that 30 per cent of energy was expended. Other experiments made with the same apparatus have enabled the necessary energy of both to be determined on analogous eprouvettes. It was found that the ordinary driver expends seven, and the ballistic driver nine. On the other hand, the latter provided with an anvil, the weight of which was equal to four times that of the driver, gave the same results as an ordinary driver with an anvil firmly fixed, and the weight of which was equal to 20 times that of the hammer. Test pieces, as nearly as possible like those made use of in the preceding experiments, both as to quality and dimensions, have been tested by Prof. Golinier's machine for testing metals, and the work necessary for obtaining a certain compression has been compared with that of a shock susceptible of giving the same results. The relation of the latter to the former is about 1.5. But this value varies according to the case, and increases for very hard materials and with the number of blows. Mr. Kick estimates that the weight that should be adopted for anvils on which iron is to be forged should at least be eight times that of the hammer, and for steel 12 times. He considers that the anvil absorbs at least 20 per cent of the force produced, and that the rest is lost in vibrations of the anvil and of the hammer, and in the elevation of the temperature of the object to be forged.

Pulverized Fuel.

A correspondent of the *Boston Journal of Commerce* writes to that paper as follows: "About 12 years ago I had a model of a cupola made to show that a great many things that were wasted could be used for fuel if ground fine and blown into the tuyeres of the cupola. I paid \$12 for the model, and was so anxious to get it that I waited very late one night until it was finished, all the time thinking what big things I should accomplish with coal dust, sawdust, and I don't know but street dust. After I got to the house that night I took up a Pittsburgh paper and read an article giving an account of the superintendent of the Edgar Thompson Steel Works being bothered with one of his large cupolas bridging over so that he could not put in any fresh stock, and the fuel was burning away that was put in the cupola, so the prospect was that the cupola would be completely humped up; but he took out the tuyere pipes and filled them with fine coal, then put in the pipes and put on the blast, and in a very short time the bridge melted down and he got out the heat in good shape. The only consolation I had was that my theory was practical, but some one else had got the start of me, because it was something I had been thinking over for years. What makes me speak of it at this time is that I have been reading a piece in the paper, stating that pulverized coal would give a better result than natural gas; that 50 per cent of the coal now used in furnaces and rolling-mills could be saved, and steel and iron greatly improved in the puddling process; and they were bold enough to say that they would confront natural gas right in Pittsburgh with sprayed coal. Now, a great many will say this is cheap talk. I don't think it is. I think there is something there that is worth looking into. I know that many useful things have been laid aside from some sneering remark from parties that did not know at the time they made them that they were hurting

themselves more than the man they were poking fun at. There are lots of people all over the world that appear to enjoy walking in the old ruts, even if it costs them five times as much to do it. Such men as these give themselves dead away every time they open their mouths. Our old-fashioned way of doing things is played out both in melting, molding, and core-making, and the parties that will fight the hardest against any change will be the ones that will be benefited the most by the change—that is, the workingman, because I know that what we are doing to-day can be done with a great deal less worry to the men, and a great deal less cost to the employer, both in our foundries and rolling-mills."

Novel Experiment with Leather Belts.

One of our English exchanges illustrates an arrangement of working two large leather belts, one on top of the other, which has been found to answer very satisfactorily. The particulars are as follows:

In the year 1880 the works where the arrangement is applied put in a double leather belt 135 feet long and 36 inches wide, made on their system, without cross joints, and of even thickness throughout, to transmit 350 indicated horse-power. The engine was a single Corliss, horizontal, with fly-wheel drum 24 feet diameter, 39 inches wide, running 48 revolutions per minute, the driven pulley being 3 feet 6 inches diameter. In consequence of extension of the works more power was required. The engine was, therefore, compounded in October, 1887, and it was arranged to transmit 350 indicated horse-power more, through another line of shafting. Not having space for another drum, and the fly-drum and shaft being strong enough for the purpose, it was decided to run a second belt under the one already at work. This second belt was also double, made on the same principle as the first, 104 feet long, 38 inches wide, driving a pulley 6 feet 6 inches diameter. This addition was started in November last, and the report of the proprietors is said to show that after the first stretching had been taken out of the new belt no other change had occurred, and that the old belt was working perfectly straight upon it, with complete success.

These results were not quite anticipated, as, from the novelty of the application, the makers were rather dubious that cross strains might be set up by slipping of the lower belt from the additional drag placed upon it. In the result, however, the experiment has proved a complete success. The principle may be very readily applied where more power is wanted without additional pulleys.

RUSTING OF SHEET IRON.—The following instructions are given relative to the prevention of rust in sheet-iron stoves: In the first place, all soot and ashes should be removed from the heater or furnace, and all openings closed so that there can be no circulation of air through it. Inside rusting has often been prevented by disconnecting the heater drum from the chimney and tying papers over the pipe-hole in the heater, thus preventing down draught through the chimney into the body of the drum, and the consequent formation of moisture on the inside of the drum as the air becomes cooled. It is suggested that nearly all trouble would be avoided if the heater were disconnected all around and a dish of lime placed in the inside to absorb the moisture. To prevent rusting on the outside, covering up with papers is recommended. The formation of moisture is of course the cause of rust; and though the room may seem quite dry, yet it may be cold enough to condense moisture on the iron if the surface is exposed, and it will then corrode rapidly.

WIRE GAUGES.—The *American Mechanic*, in answer to the question by a correspondent: "Please state if there is any variation between Stubbs' and the American wire gauges," says: "Yes, there is a difference. Stubbs' wire gauge is supposed to agree with the Birmingham wire gauge, which differs from the American gauge. But there are two Stubbs' wire gauges differing entirely from each other, one used for iron wire, the other for steel wire. Altogether the wire-gauge matter is very much mixed, and we think, now that there are other and better methods of determining the size of wire, that it would be better if all gauges, on which the sizes are designated by numbers, were to be abolished entirely, and wire designated and ordered by its actual diameter in decimal parts of an inch."

OIL OF MUSTARD AS A LUBRICATING OIL.—Chief Engineer M. Thier of Erfurt, Germany, says the *Eisen-Zeitung*, after battling for months to find a lubricator which would prevent the welding together of iron surfaces upon which much and rapid friction is exercised, such as turbine wheels, etc., has at last found that ordinary oil of mustard mixed with small quantities of petroleum, fish oil or other similar fatty substances, answers the purpose in every respect and overcomes all the difficulties heretofore experienced with machinery where excessive friction disturbs the physical quality of the metal used.

IRON IN WASHINGTON TERRITORY.—It is predicted that the iron product of Washington Territory will soon exceed that of Pennsylvania.

MALLEABLE BRONZE.—Domier has discovered that bronze is rendered malleable by adding to it from one-half to two per cent of mercury.

SCIENTIFIC PROGRESS.

The Sound of Thunder.

One of the most terse and succinct descriptions of a natural phenomenon is that recently given by Mr. Hirm, in which he says that the sound which is known as thunder is due simply to the fact that the air traversed by the electric spark—that is, a flash of lightning—is suddenly raised to a very high temperature, and has its volume, moreover, considerably increased. The column of gas thus suddenly heated and expanded is sometimes several miles long, and as the duration of a flash is not even a millionth of a second, it follows that the noise bursts forth at once from the whole column, though for any observer in any one place it commences where the lightning is at the least distance. In precise terms, according to Mr. Hirm, the beginning of the thunderclap gives us the minimum distance of the lightning, and the length of the thunderclap gives us the length of the column. He also remarks that when a flash of lightning strikes the ground it is not necessarily from the place struck that the first noise is heard. Again, he points out that a bullet whistles in traversing the air so that we can, to a certain extent, follow its flight, the same thing also happening with a falling meteorite just before striking the earth. The noise actually heard has been compared to the sound produced when one tears linen. It is due, really, to the fact that the air rapidly pushed on one side in front of the projectile, whether bullet or meteorite, quickly rushes back to fill the gap left in the rear.

There is a peculiar reverberation of sound sometimes heard during a thunderstorm which cannot be accounted for on the above theory, but which is undoubtedly due to an echo from cloud to cloud.

How Spectrum Analysis Was Discovered.

Shortly before his death, says the *New York Tribune*, the late Dr. Kirchhoff of Berlin related the true story of the discovery of spectral analysis. He and Bunsen were then professors at Heidelberg and kept bachelor's quarters in the well-known "Riesenstein." Upon one of their daily promenades Bunsen remarked: "Kirchhoff, we must discover something which will be too simple to be true." They returned and went to work. But years passed by before the discovery was effected. Experimenting one day in his laboratory, Kirchhoff happened to place a burning lamp in the rays of the sun. A dark place appeared at once. Thinking it an "optical illusion," he repeated the action, only to find the dark ray reappear and give place to the ordinary ray when the lamp was first removed. He called Bunsen. The experiment was repeated many times and always with the same result. They could not explain it. Finally Bunsen proposed that they go home and "think of other things" for awhile; possibly some explanation might be reached. They idled in their easy-chairs, smoking their long student pipes and talking of the days of their youth and the gossip of the hour. The afternoon had almost passed when Bunsen sprang to his feet with the remark: "Eureka! The flame of the lamp is fed by the same stuff that is burning in the sun!" They hurried back to the laboratory, tried a number of experiments, and the great discovery was made. That night there was a jollification in the bachelor quarters of the modest hotel. A few weeks later the whole world knew of the discovery, and Kirchhoff and Bunsen were enrolled among immortal scientists. The name Kirchhoff, by the way, means "graveyard." At a state dinner the distinguished scientist once made a speech in honor of the guest of the evening, ending with the usual "*Hoch soller leben*." Prof. Helmholtz, now head of the physical institute in Berlin, after listening to the conclusion, was guilty of the remark: "He must be immortal, indeed, to whom the Kirchhoff (graveyard) calls 'Long Live!'"

A RIVAL FOR MOUNT HAMILTON.—Denver is about to have an astronomical observatory that will rival the famous Lick observatory at Mount Hamilton. Its dome will rise from a plain and have 1000 feet greater elevation. The building and instrument have been provided for through the liberality of W. B. Chamberlain of Denver. The entire structure, with its instruments and appliances, will embrace all that skill and science can suggest to make them perfect in every particular. It is not the intention to rival the Lick instrument in size. For general work a large instrument is only an incumbrance. The elevation and atmospheric conditions of the Denver observatory will undoubtedly be superior to those at Mount Hamilton, and the two institutions will doubtless prove the two most useful and effective observatories in the world.

A SCIENTIFIC SCHOOL IN SIBERIA.—Mr. Geo. Kennan, in the current number of the *Century*, makes some statements regarding Siberia which will be a genuine surprise to most people. Among other things found there, which one would hardly expect to find in such a country as Siberia is popularly supposed to be, is a scientific school at Tiumen, which he compares to the Boston Institute of Technology. It is

called the "Realnoi Uchilshche." It occupies the largest and finest building in the town, and was erected and equipped by a wealthy citizen of Tiumen at a cost of \$85,000 and presented to the city. It has a mechanical department, with a steam engine, lathes and tools of all kinds, and a department of physics, with fine apparatus, including even the Bell, Edison, Dolbear telephones and the phonograph, a very complete and well-equipped chemical laboratory, a good library and a department of art and mechanical drawing. When one remembers that Tiumen is 1700 miles east of St. Petersburg, in a country which most every one believes (until he reads Mr. Kennan's article) contains nothing but snow and exiles, the above statements are somewhat remarkable.

HOW LEAVES CHANGE THEIR COLOR IN AUTUMN.—A botanist thus describes how the leaves change their color in autumn. He ridicules the belief that frost has anything to do with it: "The green matter in the tissue of a leaf is composed of two colors—red and blue. When the sap ceases to flow in the autumn, and the natural growth of the tree ceases, oxidation of the tissue takes place. Under certain conditions the green of the leaf changes to red; under different conditions it takes on a yellow or brown tint. This difference in color is due to the difference in combination of the original constituents of the green tissue and to the varying conditions of climate, exposure and soil. A dry, cold climate produces more brilliant foliage than one that is damp and warm. This is the reason that our Northern American autumns are so much more gorgeous than those of England."

IODIDE OF MERCURY IN TANNING SKINS.—The iodide of mercury is now used to some extent in France in tanning skins. It is said that the mercury salts act as a preservative of the constituents of the tanning liquors, and that leather produced from skins that have been previously treated in this manner is superior to that tanned in the ordinary way. It completely prevents the liquefaction of the gelatine which takes place in putrefying hides, and thus saves them from this loss. A saving is also effected by its use in the prevention of the decomposition of the tannin in the tannin liquid, which is usually hastened by the introduction of the hides when in a state of decomposition. The amount of iodide of mercury required is so small that there is no danger of poisoning, either to the workman or to those subsequently using the leather, in its use.

INVENTORS will be gratified to know that the United States Supreme Court has awarded the owner of a glycerine patent \$320,000 damages for infringements. While the license fees which were claimed would have amounted to only \$35,000, the court gave nearly ten times that sum as damages on the ground that an infringer was liable to account for all the savings and benefits derived from a wrongful use of the patent. This case suggests to railway companies and others using inventions the importance of making sure at the outset that they are not infringing any just claims of the inventors; and in this view the value of the Eastern and Western railroad associations, whose business it is to investigate the validity of patents offered to railways, is evident.

ARE WHITE ANIMALS SPECIALLY INCLINED TO DEAFNESS?—A writer in the *Boston Post* says: "Why is it, I wonder, that white animals are so often deaf? The white English terrier is almost always so, and the white English bull-terrier is very frequently afflicted with this defect. I am told by those who are skilled in white oats that they too are apt to have the same infirmity, and I have heard, though I cannot cite my authority on the spot, that a white goat is even more deaf to reason and discourse than other animals of the same species but of positive color. So far as I know, white horses have the usual sense of hearing, though investigation might prove that they were deficient in this respect."

FRESH-CUT TIMBER in very many cases contains on an average about 45 to 50 per cent of its weight in water, and if seasoned in the ordinary way this is reduced to about 15 to 20 per cent, but the fresh timber also contains air, as may be easily shown by warming one end at the fire or in hot water and watching the bubbles drive out; and the seasoned timber contains less water and more air in proportion, so that many sources of error are possible in the usual weightings of timber.

A RULE OF DOUBTFUL VALUE.—It is a regulation in Holland that every professor in a Dutch university shall resign on completing his 70th year. A scientist who possesses a good general constitution and has taken proper care of himself is fully as capable of doing good work at 70 as at any period of his life. Years do not constitute a factor in a man's life and labor, which should be applied to all alike; hence the rule in Holland must be one of doubtful value.

AN ANCIENT FOUNDATION.—Dr. Schliemann's explorations in Egypt show that the great temple described by Herodotus, which occupies a crater-like depression of about 800 feet in the delta and was composed of great monoliths and columns, had no rock foundation, but rested simply on wet, compact soil. But our City Hall must have a solid foundation of concrete.

USEFUL INFORMATION.

How Water Should be Cooked.

"Water is one of the secrets of cooking," sentimentally said a well-known chef to a New York Mail and Express reporter. "I suppose you mean all food in its raw state should be washed?" "Nothing of the kind," replied the artist. "A few cooks understand the many effects produced by hard and soft water in cooking vegetables and meat. If peas and beans, for instance, are cooked in hard water, containing lime gypsum, they will not boil tender, because these substances have a tendency to harden vegetable caselae. Now many vegetables, as onions, boil nearly tasteless in soft water, because all the flavor is boiled out. The addition of salt often checks this, as in the case of onions, causing the vegetable to retain their peculiar flavoring principles, besides such nutritious matter as might be lost in the soft water. Some of the finest dishes in the world are ruined by the use of hard water when soft is required. It is a science that can best be learned by actual experience in the capacity of assistant chef. It requires a long apprenticeship and a natural aptitude to become a great cook and to understand water. Now, to extract the juice of meat to make a broth or soup, soft water, unsalted and cold at first, is the best, for it much more readily penetrates the tissue. But for boiling, where the juices should be retained, hard water or soft water salted is preferable, and the meat should be put in while the water is boiling, so as to close up the pores at once. I have two assistants, and once a week I lecture them on the proper use of hard and soft water in cooking certain dishes. In answer to your facetious question above, I will state that not only raw food should be clean, but that water goes a long way in keeping a first-class cuisine in a healthy sanitary condition."

WHAT A CHINOOK WIND IS.—Chinook, says the Boise (Idaho) Democrat, is the name given by the Indians of the Upper Columbia to a wind that blows from the Japan current, and striking the Oregon coast on the northwest, sweeps across the coastline. The Chinook Indians lived on the Lower Columbia, and this wind, coming from the direction of their home, caused it to be called chinook—from the land of the Chinooks. The early settlers of Oregon adopted the term, and it is now heard all around the world. These life-giving wind belts range in width from one to hundreds of miles, and they cut a path through snow and ice as clean as does a tornado through a forest. Its line of travel is so distinctly marked sometimes that a strip of land can be seen running on a mountain slope with a wall of snow on each side. Its effects have been noticed here this winter. One day here last week the snow was several inches in depth, with ground frozen beneath, and things popping with cold. In 24 hours the streets were muddy.

THE GOOD WHICH RATS DO.—Though the rat is a despised animal, says Good Housekeeping, yet he is a useful servant to man, for the animal lives in and near human habitations and eats every particle of refuse and filth that he can get at. He is the only animal which can thrive and keep a clean coat in the most filthy localities, where the air would be fatal to any other creature. Rats are almost incessantly licking their fur to keep it clean, and, though they doubtless become a nuisance in many instances and places, yet they after all perform great service for mankind, especially in cities, by cleaning up every edible thing that would eventually become a source of noxious odors and of disease.

CASTOR OIL FOR DRAWING WIRE.—A correspondent of the English Mechanic writes as follows in a recent issue: "The Asiatic wire-drawers have very long ago used castor oil in preference to any other kind. Their dexterity is surprising, the wire for the trichinopoly chains of gold and silver being like hair, and every good workman draws his own. A man made me a plate for the fine gauges from a flat rasp of English steel, which I still possess. He drew copper, zinc and brass equally well. Castor oil, being one of the cheapest oils in India, is often used to soften hard leather, shoes and ropes. For feeding large drills I like this oil mixed with soft soap."

HOW TO KEEP AFLOAT.—Numerous drowning accidents occur every summer through lack of knowledge that every boy or girl should acquire as the first part of their education. It is no great art to keep the body afloat, or so much as is necessary to keep above the surface. In the excitement of a sudden submersion, the victim strikes out wildly for help. Generally he or she throws hands or arms above water, and, of course, down goes the head. All that need be kept above the surface is the nose or mouth. Quiet, regular breathing, and the slightest motion of the hands under the water, will keep mouth and nose above the surface. If this were often thought of, few need drown.

A NEW CAR-HEATER.—To provide means of heating steam-heated passenger cars when the locomotive is detached, "a blizzard heater," so called, has been devised, consisting of a fire-brick pit and a telescopic chimney, on the principle of the travelers' pocket drinking cup.

When not in use the whole thing occupies only 101 inches of space, and may be shoved under a seat and out of the way. It is hung by chains from the car roof and floor.

CASTOR OIL LEAVES, fresh from the plant, bruised or rubbed in the hands, and then stuffed tightly into a stiff boot or shoe and left to remain for 12 or 24 hours, according to the character of the leather, will render the same quite supple—so it is said.

LONDON has eight homes for poor working girls, where they can get three tolerable meals a day for \$1 a week.

A POUND of peas is worth \$1.42. A pound of five-cent pieces is worth \$45.50.

GOOD HEALTH.

Impaired Sight of Ironworkers.

It is a fact, says a Pittsburg paper, that a large percentage of the men employed as heaters in the iron-mills of Pittsburg are more or less troubled with defective vision, the nature of their work compelling them to gaze for protracted periods upon the intensely dazzling light of metal at white heat, which they must be able to distinguish from the flames of burning gas which surround it. Secretary William Martin of the Amalgamated Association of Iron and Steel Workers in Pittsburg, says that among men who have worked for a few years in iron-mills, near-sightedness or weakness of the eyes is almost universal, and advised the reporter to interview a few of the employees of any mill in the city to test his statement.

This was done, resulting in confirmation from half a dozen heaters in one of the largest rolling-mills in the city. The men seen had worked in the iron-mills for periods ranging from 3 to 12 years, and with very slight differences their powers of vision had all been affected in the same manner. They are unable to distinguish small objects at any considerable distance. One was entirely unable to read the print in an ordinary newspaper; another pointed out a clock with a dial a foot in diameter, and said he could not see the hands ten feet away. With one the trouble was permanent and unvarying, while another's eyes were restored to their normal condition if he stopped a month. None of them experience pain, and it does not seem to have occurred to any one that a physician's services were needed. They regard the change that takes place in their eyes as a sort of process of "getting used" to the necessary requirements of their trade.

The reporter on looking into one of their blazing heaters could distinguish only a blinding glare, scarcely inferior to the dazzling light of the sun itself. Yet these men must be able to see clearly the white hot masses of metal through the flames of the gas that is burning all around them. The difficulty of doing this may be compared to that which would be experienced in trying to perceive one bright light through another. Yet the experienced heater does it with as much ease as if the hot iron were as much wood floating in water. They say that no degree of proficiency can be acquired in less than three months' time, and that since the employment of natural gas in the furnaces the difficulty has become much greater and the effect upon the eye more pronounced.

IVY AND OAK POISON.—A writer in the Popular Science News gives the treatment which he has often found serviceable in his own case when poisoned with ivy: "I have always been extremely susceptible to the poison of poison ivy and oak, so as to give me great annoyance, unless it is immediately checked on its first appearance. This, common washing-soda does for me, if properly applied. I make the application by saturating a slice of loaf bread with water, then cover one surface with soda and apply to the eruption, the soda next the flesh. When the bread is dried by the animal heat, I drop water on the outer side, so as to keep it thoroughly moistened, and dissolve the soda crystals in contact with the skin. This, you will perceive, is merely a bread poultice, the bread being a vehicle through whose moisture the soda reaches the humor. I find that washing or bathing with soda water, even continually, will not suffice with me. My skin requires the heat and moisture of the bread in order for the soda to act on and neutralize the poison. I rarely have need to retain this soda poultice for more than 30 minutes to any affected part. No pain ensues. Formerly I suffered often for weeks, as the poison would spread all over my body. Now 30 minutes measures the duration of its exhibition."

CONDIMENTS AND INDIGESTION.—BANEFUL EFFECTS OF RED PEPPER.—Cayenne pepper may be selected as a typical example of a condiment properly called. Mustard is a food and condiment combined; this is the case with some others. Curry powders are mixtures of very potent condiments with more or less farinaceous materials and sulphur compounds, which, like the oil of mustard, onions, garlic, etc., may have a certain amount of nutritive value. The mere condiment is a stimulating drug that does its work directly upon the inner lining of the stomach, by exciting it to increased and abnormal activity. A dyspeptic may obtain immediate relief by using cayenne pepper. Among the advertised patent medicines is a pill the ac-

tive constituent of which is cayenne. Great relief and temporary comfort are commonly obtained by using it as a "dinner pill." If thus used only as a temporary remedy for an acute, and temporary, or exceptional attack of indigestion, all is well; but the cayenne, whether taken in pills or dusted over the food, or stewed with it in curries or otherwise, is one of the most cruel of slow poisons when taken habitually. Thousands of poor wretches are crawling miserably toward their graves, the victims of the multitude of maladies of both mind and body that are connected with chronic incurable dyspepsia, all brought about by the habitual use of cayenne and its condimental cousins. The usual history of these victims is that they began by over feeding, took the condiment to force the stomach to do more than its healthful amount of work, using but a little at first. The stomach became tolerant of this little and demanded more; then more, and more, and more, until at last the inflammation, ulceration, and torpidity, and finally the death of the digestive powers, accompanied with all the long train of miseries to which we have referred.—Knowledge.

DEATH BY DROWNING.—We have never seen this matter more tersely described than in the following words: After a person is below the surface long enough, he fills his lungs with water. The first stage of deep inspiration lasts about ten seconds, followed by a reaction caused by the resistance to the entrance of water into the bronchiales. This is followed by arrest of respiration and loss of consciousness. In a few seconds more he makes four or five respiratory efforts and then dies. Immersion causes an immediate rise in the blood pressure with slowing of the heart-beats. The action of the heart remains slow but strong, till death ensues. The pressure gradually lessens, but rises just before death, to fall to zero immediately afterward. The heart continues to beat feebly for 20 minutes in some cases. The period of respiratory resistance is therefore due to the respiratory muscles and not to spasms of the glottis.

LEPROSY IN NEW BRUNSWICK.—This dreaded disease is rapidly spreading itself over this country and the British Provinces. There has not possibly been a day for many years when there was not one or more cases of leprosy in San Francisco. It is found constantly or at intervals in nearly all our large cities. At the present moment there are 17 leprosy patients confined in the lazaretto at Tracadie, New Brunswick—eight males and nine females. During the past year three deaths occurred from the disease, while one escaped to the United States, where probably the seeds of the disease may be sown to raise up a colony of these unfortunate beings.

RELATIVE SIZE OF THE HEART.—The London Standard gives an account of a German doctor's investigation as to the size of men's and women's hearts. The masculine heart weighs more and is larger than that possessed by the fair sex. A heart, it would appear, grows most quickly during the first and second years of life, and between the second and seventh years it doubles in size. Until after the 50th birthday the heart still grows a little. In childhood the male and female heart are the same size; but after manhood the masculine heart develops much more than the female, and ends by being two square inches larger than the latter.

GROWTH OF THE BRAIN.—The human brain reaches its greatest size between the ages of 14 and 20 in both sexes; after that it grows continually smaller, but increases in weight, through life. While intelligence is rapidly increasing from 20 to 60 years of age, the brain is diminishing in size, but increasing in weight. The time that a man knows most is from 70 to 80; but then his brain is smaller than when he was a boy between 7 and 14, the age when he thought he knew the most. The weight of the brain in man or woman is the test of the capacity for intelligence, not the size.

A NEW REMEDY FOR SEASICKNESS.—Dr. W. H. Gardner, United States army, reports having treated many cases of seasickness with oxalate of cerium, in 10, 15 or 20 grain doses, every two or three hours. He believes that 75 per cent of all cases that occur will be cured by this remedy. As oxalate of cerium is a recognized drug to be administered in cases of nausea and vomiting, there is no reason why it should not be efficacious in seasickness.

A NEW OPIATE.—A German professor has discovered a new opiate which he calls "eufonal." It belongs to the group of the so-called diemphates. It has the property of inducing sleep in invalids, particularly in nervous people and those affected with heart disease, but not in healthy subjects. It is declared to be harmless and a certain means of causing slumber.

STOOPING FORWARD.—The London Lancet says: If the apparently small matter of stooping forward were generally understood, there would be fewer head and heart troubles, and we will go so far as to say that some lives now lost would have been saved.

PARALDEHYDE is a new sleep-producer. Its action is quicker than chloral, it is as safe as the bromides, and is not injurious, except when used to excess.

Telegraph Lines and the Interstate Commission.

A very important bill, designed to prevent unjust discriminations, and to secure equal privileges for all persons and parties in regard to telegraphic service, having previously passed the House of Representatives, has finally passed the U. S. Senate.

The first section of the bill provides that all railroad and telegraph companies which have received Government aid in the construction of their lines, either by loans or land grants, and which, by the act of incorporation, or subsequent amendatory acts, are required to construct, maintain or operate telegraph lines, and all companies engaged in operating said railroad or telegraph lines "shall forthwith and henceforward, by and through their own respective corporate officers and employees, maintain and operate for railroad, Government, commercial, and all other purposes, telegraph lines, and exercise by themselves alone all the telegraph franchises conferred upon them and obligations assumed by them under the acts making the grant as aforesaid."

The second section requires all such subsidized companies to allow any and every telegraph company which has complied with certain legal provisions to connect its line with theirs at any of their stations or offices where their lines may meet, "for the prompt and convenient interchange of telegraph business between said companies, and such railroad or telegraph companies referred to in the first section of this Act shall so operate their respective telegraph lines as to afford equal facilities to all, without discrimination in favor or against any person, company or corporation whatever, and shall receive, deliver and exchange business with connecting telegraph lines on equal terms, and affording equal facilities and without discrimination with or against any such connecting line, and such exchange of business shall be on terms just and equitable."

In case any such company, or company operating such a railroad or telegraph line, refuses or fails to comply with the provisions of the first and second sections, then any person or company may apply for relief to the Interstate Commerce Commission, whose duty it shall be forthwith to investigate the case, determine what is right therein, notify the parties concerned, and, if need be, enforce the order by writ of mandamus in the U. S. Courts. And the commission may institute any such inquiry at their own motion, just as if complaint had been made.

The Statue to Master Mechanic Stevens.

At a meeting of the Executive Committee of the A. J. Stevens Statue Association last week, it was agreed to commence soliciting subscriptions July 23d.

Meetings of the Executive Board are to be hereafter held on the first Friday after the first Monday in each month. The secretary was instructed to invite the employees in the freight shed, chief clerks, and Fourth-and-Townsend street offices to unite with them and appoint a committee to solicit subscriptions from their respective divisions.

Following is the circular sent out:

To the Employees of the S. P. R. R. and C. P. R. R.:—GENTLEMEN: As was promised in the circular addressed to you last month, a mass meeting of those interested in the erection of a statue to the memory of our late Master Mechanic, A. J. Stevens, was called and an association formed with the following officers: President, E. B. Hussey; Vice-President, W. B. Oldfield; Recording Secretary, Walter Van Guilder; Financial Secretary, James E. Camp; Finance Committee, J. H. Ferguson, Thomas Warmby, F. Gaschlin, John West and Thomas Sweeney; Executive Committee, Charles Joy, Charles Pritchard, W. G. Cox, Ben Miller, J. F. Carter, E. D. Chapman, Edward Payne, John Hansman, P. Sullivan, M. J. Burke, I. R. Taylor, James Stewart, Frank Van Gilder, W. B. Hunt, Henry Fisher, F. W. Golden, Wm. Smith, Frank Billings, M. J. Scanlin, and Thomas Fraser, Jr.

It has been decided in joint committee to take up subscriptions at such sums per month as subscribers may deem proper, and continue such monthly subscriptions for ten consecutive months, payment to be made to the member of the Executive Committee representing the department in which the subscriber is employed. It will be necessary to raise at least \$5,000, and it will be seen at once that in order to raise that amount, it will be necessary for every man to be as liberal as possible. Let us show to the world that we are workmenmen are appreciative and liberal, and that we are capable of carrying out a great and noble undertaking. Let us by our appreciation attract the attention and thoughts of our people to the fact that a mechanic can, if he will, rise to the level of the world's benefactors and deserve and receive the highest tribute paid our honored dead.

Mr. — will call upon you for your subscription. Hoping you may accord him a cordial reception and find it in your power to subscribe liberally, we remain, yours in the good cause,

E. B. HUSSEY, Pres.,
W. B. OLDFIELD, Vice-Pres.
WALTER VAN GUILDER, R. S.
JAMES E. CAMP, F. S.

The Skeena river revolt continues to cause great excitement in the Northwest. The local militia at Winnipeg is prepared to start for scene of the outbreak on short notice.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO

Saturday Morning, Aug. 4, 1888.

TABLE OF CONTENTS.

EDITORIALS.—New Appliances for Working Gravel Deposits; Exchequer Mining Camp, 69. Passing Events; The English in Mining; New Ore Concentrator, 76. The Miner's Inch; An Unfortunate Strike, 77. The Value of the Lumber Product; Master Mechanics' Association—Locomotive Construction; The Production and Uses of Borax, 78.

ILLUSTRATIONS.—Press Tank Used in Russell Process; Cashier Mine, Exchequer District, 69. Construction of Triangular Weirs, 77.

CORRESPONDENCE.—From the Comstock; Placer County Mines; Mining in Nevada County; The Niehart District, Montana, 70.

MISCELLANEOUS.—The Water Power at Folsom; The Hidden Treasure Mine Fire, 70. The Russell Process, 71. Telegraph Lines and the Interstate Commission; The Statue to Master Mechanic Stevens, 75. **MECHANICAL PROGRESS.**—Forging by Pressure or by Blows; Pulverized Fuel; Novel Experiment with Leather Belts; Rusting of Sheet Iron; Wire Gauges; Oil of Mustard as a Lubricating Oil; Iron in Washington Territory; Malleable Bronze, 74.

SCIENTIFIC PROGRESS.—The Sound of Thunder; How Spectrum Analysis Was Discovered; A Rival for Mount Hamilton; A Scientific School for Siberia; How Leaves Change their Color in Autumn; Iodine of Mercury in Tanning Skins; Are White Animals Specially Induced to Deafness; A Rule of Doubtful Value; An Ancient Foundation, 74.

USEFUL INFORMATION.—How Water Should be Cooked; What a Chinook Wind is; The Good Whet Stone; Castor Oil for Drawing Wire; How to Keep Afloat; A New Car Heater, 75.

GOOD HEALTH.—Impaired Sight of Ironworkers; Ivy and Oak Poison; Condiments and Indigestion; Death by Drowning; Leprosy in New Brunswick; Relative Size of the Heart; Growth of the Brain; A New Remedy for Seasickness; A New Opiate; Stopping Fools, 75.

SHOP NOTES.—A Tool for Under Planing; Keeping Tools; Oiling Steel a Lusterless Polish; Grinding Twist Drills; Water Cooler; The Detection of Hot Bearings; Handy Mixture for a Machine Shop; Secure the Loose Joints; How to Use Babbit Metals, 79.

STEAM BOILER NOTES.—Advantages and Disadvantages of the Surface Condenser; Proportions of Locomotive Boiler and Engine, 79. Throttling the Steam Supply; Proper Thickness for Boiler Plates; Engine Foundations; A Long Run by a Steam Engine; Sensible and Sound; Cornet is not Needed; Economical Press; Increase Working Pressure in Marine Engines, 80.

OUR LUMBER INTERESTS.—The Donahue Railroad Extension; Device for Handling Lumber; Lumbering in California, 80.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 72-78.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 84.

Business Announcements.

[NEW THIS ISSUE.]

Books—C. A. Stetefeldt, New York.
Gold Mine—J. B. Bainbridge, Pasadena, Cal.
Civil and Sanitary Engineer—Hy. Jackson.
Mining Engineer—Modest Maryanski.

See Advertising Columns.

Passing Events.

The reduction in the price of lumber which has been announced will stimulate the building industry again. Lumber has been so high of late that many persons have been deterred from building. Coasting freights have fallen, and there is now an abundant supply of lumber.

The experiment of mining the bed of the Carson river by means of dredges will soon commence. A large Webber centrifugal pump has been shipped to the Dredging Co., completing the machinery for the dredge. They expect to begin work by the 1st of September.

The coal resource of Alaska are attracting

attention. A vessel has been chartered in this city and will soon leave with miners and tools, to properly develop the mine. About 150 tons of coal are now ready for shipment.

It is stated that the U. S. Attorney General will enter proceedings against every hydraulic mine which maintains pipes and monitors, whether used or not. The object is to enforce the decisions of the courts and cause a complete dismantlement of the mines. The removal of pipes and monitors is to be regarded as prima facie evidence of intent to comply with the law. It remains to be seen whether the U. S. has any control over the machinery of a mine as well as of a mine itself.

The English in Mining.

There exists just now great business stagnation throughout all parts of Great Britain. The complaint of dull times is universal and goes to all her leading industries; agriculture, manufactures, trade, commerce, all are depressed to an unwelcome degree. Even her coal and iron interests are suffering severely. With affairs at such low ebb many will wonder how it is these people have always money to invest in any promising enterprise, more especially in mining. If their lands and shops and factories and so many of their other home industries are affording them such scanty profits, whence, it is natural to inquire, come the revenues that keep their private coffers always full and their public credit always at par? It is, we opine, the income they derive from their foreign mining ventures that enables the English to invest so largely and so readily in the innumerable schemes that are brought to their notice. This constitutes, no doubt, the principal source of their large ready means and great financial strength. The extent to which they have embarked their means in this business would surprise those who have not had special information on the subject.

There occurs hardly a mineral or metallic product in nature but what this energetic, money-seeking race have made the object of their enterprise, nor is there a land under the sun in which they have not sought after these forms of wealth. In every hemisphere and under every zone English companies are to be found opening up and working mines, the English expert being there also searching after others wherever paying deposits have been met with. Nearly all the rich and well-to-do in that country pay more or less attention to mining, London being the grand center of all this energy, enterprise and far-extended operations. No matter where the property is situated or where a majority of the shareholders may happen to live, there is located the chief office and there do most of the directors reside. To London comes the bullion from the gold and silver mines, and thither all reports are sent. The mails are heavily freighted with these messages from far-off lands, the ocean cables transmitting the more urgent and important. Much profitable business do the latter derive from this source. The number of these mining companies having their headquarters in the great metropolis exceeds belief, their nominal capital actually amounting to billions.

While a great many of these ventures prove disappointing, not a few ending in early and total failure, enough succeed to make the business fairly profitable. Formerly, and for a good while at first, the losses sustained were much greater than they have been for some time past, English experience having in this respect accorded with the rule elsewhere general. It is not so easy now to float on the English market a worthless mine, or even one of dubious value, as it was 10 or 15 years ago. No offering will be touched, though in the hands of the most influential promoters, unless it show substantial merit, these British investors having become very wary and discriminating of late. While a deserving property can be readily placed over there, it would be easier, probably, to handle one of the wild-cat order in this country than in any of the larger cities of England or Continental Europe.

As regards home management, the English have always conducted this department of mining affairs in a more sensible and business-like way than has been common with us. British shareholders are accustomed to give much personal attention to the business. They largely attend all meetings of the companies in which they are interested and take an active part in

the proceedings. After the annual report of the company has been submitted to the meeting, it is carefully considered and is apt to be much discussed before being adopted, shareholders being in the habit of asking the chairman questions concerning matters about which they are ignorant or in doubt. At these meetings every man expresses his mind freely, the management being sometimes very sharply criticised. But everything is conducted with order and decorum, nothing of a rancorous or grossly personal kind ever being indulged in. In these discussions, though they often wax very animated, little ever occurs calculated to mar the amenities of debate. The proceedings of these meetings, or a very full synopsis of them, appear in all the leading mining journals, whereby both the shareholders and the general public are kept well informed in regard to the affairs of these mining companies.

It is no doubt to their mining ventures and the care with which they look after them that British investors are mainly indebted for their seemingly inexhaustible store of wealth and their sound financial standing; and to this industry would the English people do well to hark back themselves even more largely than they yet have done in this, the hour of their industrial and commercial decadence. This sturdy and indomitable race with such a training school as their island affords can continue to reach out and gather in the mineral products of every country and thus go on enriching themselves, even while the other sources of their prosperity and power are being dried up. If there is salvation for failing England, it lies manifestly in this direction. Here the growing manufacturers of other nations will not much affect her, this being a field in which she can employ her skill, energy and capital to great advantage, and in which she will have nothing to fear from overproduction or competition. That a people so sagacious will not be long in discovering this fact, nor slow in availing themselves of these outlying opportunities to recuperate their waning strength, may well be believed.

Mining Bureau Contributions.

Among recent additions to the museum of the California State Mining Bureau are the following:

Liroconite, Cornwall, Eng.; eudialite, Greenland; conellite, Cornwall; pucherite, Saxony; prelesmit, Tyrol; baryto-calcite, England; mimetite, England; condurrite, Cornwall; melphanite, Norway; gyrolite, Greenland; brewsterite, Scotland; brackehuschite, Argentine Republic; triplite, Bohemia; quartz crystal, enclosing limonite, Wales; chrysoberyl, Ural mountains; glaucodot, Chili; rhodocrosite, Colorado; millerite, Pennsylvania; triphylite, Maine; axinite, France; samarskite, North Carolina; pyromorphite, Germany; cronstedite, Cornwall; white tourmaline, Elba; diopside, Serbia; realgar (crystallized), Hungary; natrolite, Ireland; anataxe, Switzerland; corundum (crystal), India; aragonite (crystals), Herrensgrund; pyromorphite, Germany.

Quinnahar from Santa Rosa, on the line between the States of Morelos and Mexico, Mexico, the first mine worked for quicksilver in America, opened in 1718, J. W. C. Maxwell.

Livingstonite (sulph-antimonide of mercury), Trinidad mine, Huizucoc, State of Guerrero, Mexico, J. W. C. Maxwell.

Salt pure enough for domestic use as found, Tehachapi, Summit valley, Kern county, Cal., Judge P. D. Green.

Five specimens Eastern minerals from M. Braverman, Visalia.

Copper ore, Lower California, Geo. E. Mills.

Silver ore of very complex nature, Elko, Nevada, J. W. McDonald.

Fine red sandstone from the quarries of the Arizona Sandstone Co., Chino, A. T., of which the courthouse at Los Angeles is built, W. H. English.

The Arizona Apaches are getting restive, and there are fears of an outbreak. It is probable that if the Indians go on another raid it will be their last one, for the residents of Arizona will not be satisfied with any foolishness, but will insist on the removal of all Indians that are left to some other region.

PROF. C. M. WOODWARD delivered the first lecture at the Cogswell Polytechnic Institute, on the subject of "Industrial Education." The institute will soon be formally opened.

VALENTINE EICHEL, a miner well known in Arizona, was terribly injured by a fall down the shaft of the Topaz mine at Tombstone last week.

SISKIYOU COUNTY has large areas of unprospected and undeveloped mineral land.

New Ore Concentrator.

Frank B. Morse, a mining superintendent of Murphy's, Calaveras county, has just received through the MINING AND SCIENTIFIC PRESS Patent Agency a patent for an improvement in concentrators. The improvement is applied to that class of concentrators such as the Frue and Triumph, in which an endless belt is employed and to which a positive shaking motion is imparted.

The invention is applicable to any of the endless-belt concentrators. These machines differ from one another in details of construction relative to the framework and mechanism for imparting to the belt its several motions, but they all resemble one another in the employment of a common feature—the endless traveling belt to which a positive shake is imparted.

These belts have been made of canvas, especially the earlier ones, but they are now usually made of rubber. The sides have guard flanges and their surfaces are smooth. They are set at a slight inclination and have an uphill travel, at the same time receiving a shake motion either sideways, endwise or an eccentric movement resulting from a combination of single movements.

The general operation is that the stream of water flowing down the inclined belt carries the lighter or waste particles of the pulp with it to the lower end, while the heavier particles or sulphurets cling to the belt and proceed upwardly with its travel against the flow of water, pass around the upper end and are deposited in the tank below.

Instead of using the ordinary belt with the flat or smooth surface, Mr. Morse uses one with a surface consisting of a continuous series of short vanning surfaces, rising at a considerable angle to the horizon and to the general grade of the belt. These elevated vanning surfaces are connected by a series of steep inclined surfaces. This construction changes the vanning surface of the belt from a downwardly sloping surface, as in a smooth belt, to a partially upwardly sloping surface.

The water and pulp flow down the depressed surfaces and are forced up and over the elevated surfaces, and over these latter surfaces the separation of the lighter particles takes place. On a plane-surfaced belt the separation depends largely on the adhesion of the heavier particles to the belt; but, by having the vanning surfaces elevated, Mr. Morse claims there is, in addition to the adhesion, a separation due to the difference of specific gravity of the particles in a current of water. The current of water flowing up the inclined elevated surfaces will take the light stuff, while the heavier stuff will move down through this current and lodge in the angles between the inclined and depressed surfaces. The belt is really formed into a series of riffles which are shaped like an inverted V, with one angle considerably longer than the other. Mr. Morse is of the opinion that a belt made this way can be made shorter than the ordinary ones to accomplish the result. It will also work with a thin stream of pulp. A larger stream of water can be used and any variation in the amount of pulp may be permitted.

THE Mechanics' Fair opens in this city on August 7th, and if we are to judge by interview with the Fair officials, it will be the finest yet, there being an unprecedented demand for space. A new annex 250 feet by 50 feet has been built for agricultural implements, so that now about all the machinery will be outside the main building.

MINERALS IN CHINA.—There is no question but that China is exceedingly rich in minerals—both useful and precious. In many districts the roofs of the houses are covered with copper tiles. A late English paper records the fact that a shipment of several thousand copper roofing tiles was recently received in London from China.

At a special meeting of the stockholders of the Eureka Con. Mining Company, D. Friederich was elected director, vice H. R. P. Hutton, and H. P. Bush, secretary, vice Cunningham, resigned.

At Quijota district, Arizona, last week, the thermometer marked 115 degrees in the shade, and it was very hot in the mines there.

THE Federal Government will enforce a strict observance of the hydraulic mining laws.

The Miner's Inch.

How to Determine Quantity of Water.

In California the measurement of water is by what is known as "miner's inches," but, unfortunately, there is no standard of exactness.

Mr. Aug. J. Bowie, in his work on "Hydraulic Mining in California," in speaking of this subject, says: The miner's inch of water is a quantity which varies in almost every district in California; no one gauge has been uniformly adopted, nor has any established pressure been agreed on under which the water shall be measured. In some counties there are 10, 11, or 12 hour inches, and in others there is a 24 hour inch. The apertures through which the water is measured are generally rectangular, but very greatly in width and length, being from 1 inch to 12 inches wide, and from a few inches to several feet long. The discharges are through 1-inch, 1½-inch, 2-inch, and 3 inch planks with square, or with square and chamfered edges, combined or not, as the case may be. The bottom of the opening are sometimes flush with the bottoms of the boxes, sometimes raised above them. The head may denote the distance above the center of the aperture, or again that above the top, and varies from 4½ inches to 12 inches above the center of the aperture.

The Smartsville inch is calculated from a discharge through a four-inch orifice with a seven-inch head; that is to say, the head is seven

the sea-level. The *module* used was a rectangular slit 50 inches long and two inches wide, with head seven inches above the center of the opening. The discharge was over a three-inch plank, the outer inch chamfered, as shown in accompanying engraving. The size of the opening was taken with a measure (micrometer attached) which had been compared with and adjusted to a standard United States yard. Time was read to one-fifth of a second; the level of the water (drawn from a large reservoir) was determined with Ryden's book, micrometer adjustment. The following results were obtained:

One miner's inch will discharge in 1 second .026 cubic feet; 1 minute, 1.57 cubic feet; 1 hour, 94.2 cubic feet; 24 hours, 2260 S cubic feet.

The coefficient of efflux was 61.6 per cent. These figures are within the limit of 1-500 possible error. The experiments were made by H. Smith, Jr., C. E.

As the two-inch aperture requires too much space for gauging large quantities of water, custom has changed the form of the meter, and an aperture 12 inches high by 12½ inches wide, through one and one-half inch plank, with a head of six inches above the top of the discharge, is now used. These openings discharge what is counted as 200 miner's inches.

A series of experiments was made by Mr. Aug. J. Bowie at LaGrange, Stanislaus county, California, latitudes $37^{\circ} 41' N.$, elevation 216

Van Nostrand of New York) engravings which we here reproduce showing how to determine the discharge through triangular notch. The method described by him is as follows:

Discharge Through Triangular Notches.

The right angled triangular notch of thin sheet iron is a very convenient way of measuring the discharge of water. According to Prof. Thompson's experiments, the discharge in cubic feet per second = head^{3/2} (in inches) x 0.0051.

To use the notch, construct a weir box, *O*, with a notch, *Y*, (see cuts), made of iron, fitted in one end. The edges of the notch must be sharp and beveled out, and the inside face must be placed at right angles to the surface of the water, *M*. Place in the box bolls-boards or strips, *KK*, to render the surface of the water near the point *A* uniform or still (*A* is taken about 18 to 24 inches back from the weirs-plats *Y*). Place a spirit-level or straight-edge, *C*, on the weir-plats at *E*; measure the distance at *A* from *H* to surface of water. Subtract this from *C*, and find the difference in column marked *h* of accompanying table. Opposite *h*, in column *Q*, will be found the number of cubic feet of water flowing over the notch in one minute.

DISCHARGE OF WATER THROUGH A RIGHT-ANGLED TRIANGULAR NOTCH.

h , Head, inches.	Q , Quantity per min., cubic feet.	h , Head, inches.	Q , Quantity per min., cubic feet.	h , Head, inches.	Q , Quantity per min., cubic feet.
1.05	0.3457	4.75	15.04	8.40	62.58
1.10	0.3884	4.80	15.44	8.45	63.61
1.15	0.4340	4.85	15.85	8.50	64.45
1.20	0.4827	4.90	16.26	8.55	65.31
1.25	0.5345	4.95	16.68	8.60	66.37
1.30	0.5890	5.00	17.11	8.65	67.34
1.35	0.6480	5.05	17.54	8.70	68.35
1.40	0.7090	5.10	17.97	8.75	69.30
1.45	0.7747	5.15	18.42	8.80	70.30
1.50	0.8432	5.20	18.87	8.85	71.30
1.55	0.9153	5.25	19.32	8.90	72.31
1.60	0.9909	5.30	19.77	8.95	73.33
1.65	1.0700	5.35	20.26	9.00	74.36
1.70	1.153	5.40	20.73	9.05	75.40
1.75	1.240	5.45	21.22	9.10	76.44
1.80	1.330	5.50	21.71	9.15	77.49
1.85	1.424	5.55	22.20	9.20	78.55
1.90	1.522	5.60	22.70	9.25	79.63
1.95	1.625	5.65	23.22	9.30	80.71
2.00	1.731	5.70	23.74	9.35	81.80
2.05	1.841	5.75	24.25	9.40	82.90
2.10	1.955	5.80	24.79	9.45	84.01
2.15	2.074	5.85	25.33	9.50	85.12
2.20	2.196	5.90	25.87	9.55	86.24
2.25	2.323	5.95	30.42	9.60	37.37
2.30	2.455	6.00	26.98	9.65	88.52
2.35	2.590	6.05	27.55	9.70	89.67
2.40	2.730	6.10	28.12	9.75	90.83
2.45	2.875	6.15	28.70	9.80	92.00
2.50	3.024	6.20	29.28	9.85	93.18
2.55	3.177	6.25	29.88	9.90	94.37
2.60	3.335	6.30	30.48	9.95	95.56
2.65	3.498	6.35	31.09	10.00	96.77
2.70	3.666	6.40	31.71	10.05	97.98
2.75	3.838	6.45	32.33	10.10	99.20
2.80	4.014	6.50	32.96	10.15	100.45
2.85	4.196	6.55	33.60	10.20	101.67
2.90	4.382	6.60	34.24	10.25	102.92
2.95	4.574	6.65	34.89	10.30	104.18
3.00	4.770	6.70	35.66	10.35	105.45
3.05	4.971	6.75	36.23	10.40	106.73
3.10	5.178	6.80	36.97	10.45	108.02
3.15	5.388	6.85	37.58	10.50	109.31
3.20	5.606	6.90	38.27	10.55	110.62
3.25	5.827	6.95	38.96	10.60	111.94
3.30	6.054	7.00	39.67	10.65	113.26
3.35	6.285	7.05	40.38	10.70	114.60
3.40	6.523	7.10	41.10	10.75	115.94
3.45	6.765	7.15	41.83	10.80	117.29
3.50	7.012	7.20	42.56	10.85	118.65
3.55	7.267	7.25	43.30	10.90	120.02
3.60	7.524	7.30	44.06	10.95	121.41
3.65	7.788	7.35	44.82	11.00	122.81
3.70	8.058	7.40	45.58	11.05	124.21
3.75	8.332	7.45	46.36	11.10	125.61
3.80	8.613	7.50	47.14	11.15	127.03
3.85	8.899	7.55	47.92	11.20	128.45
3.90	9.191	7.60	48.72	11.25	129.90
3.95	9.489	7.65	49.53	11.30	131.35
4.00	9.792	7.70	50.34	11.35	132.81
4.05	10.10	7.75	51.16	11.40	134.27
4.10	10.41	7.80	51.99	11.45	135.75
4.15	10.73	7.85	52.83	11.50	137.23
4.20	11.05	7.90	53.67	11.55	138.73
4.25	11.39	7.95	54.53	11.60	140.23
4.30	11.73	8.00	55.39	11.65	141.75
4.35	12.07	8.05	56.20	11.70	143.28
4.40	12.42	8.10	57.14	11.75	144.82
4.45	12.78	8.15	58.03	11.80	146.36
4.50	13.14	8.20	58.92	11.85	147.91
4.55	13.50	8.25	59.82	11.90	149.45
4.60	13.89	8.30	60.73	11.95	151.05
4.65	14.27	8.35	61.65	12.00	152.64
4.70	14.65				

1 cubic foot = 7.48 U. S. gal.; 1 U. S. gal. = 8.34 lbs.

The legal definition of a miner's inch (see Water Rights, State of California, Civil Code, Section 1415) is that quantity of water which will flow through an opening of one square inch in the bottom or side of a vessel, under a pressure of four inches above an opening. Fifty of these miner's inches is equivalent to a discharge of one cubic foot of water per second, and is less by .312 of a cubic foot per second than the "Nevada county miner's inch." To get the number of gallons in miner's inches, multiply the given number of inches by 14.961, pointing off five decimal places; the result gives the number of gallons discharged per second. To get miner's inches in gallons, divide the number of gallons, flow or discharge per second, by 8.9766; result will be number of miner's inches sought.

The following table from the *Statistician* gives

the water measurement in the State of California by 11 different ditch companies, legal measurement of the State included:

NAME OF DITCH (COMPANY, ETC.)	OPENING		Through 4 Planks Inches.	HEAD-UP BOARD		Gable feet per cu. yd.
	Depth, in fath. Inches.	Width, inches.		Above opening Inches.	Below opening Inches.	
State of California (Legal Measure).....	1	1	1	4	3½	1.394
Amador Canal Co.....	1	1	1	5	5	1.400
Eureka Lake and Canal Co.....	1	1	1½	6	6	1.45
Elk Point Canal and Shilling Co.....	1	1	1½	6	6	1.45
Elk Point Canal Co.....	1	1	1½	6	6	1.45
Mok & Campo Street C. & M. Co.....	1	1	1½	6	6	1.45
Union Water Co., Murphy.....	1	1	1	4	4	1.45
South Yuba Canal Co.....	1	1	1	6	6	1.45
N. Bloomfield & B. G. M. Co.....	1	1	1	6	7	1.655
Ballston Ditch Co.....	1	1	1	7	7	1.655
Shasta Ditch Co.....	1	1	1	7	7	1.555
Shasta River Ditch Co.....	1	1	2	7	9	1.78

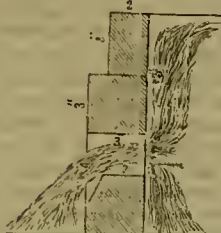
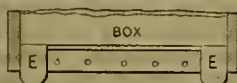
An Unfortunate Strike.

There is no intelligent, well-disposed man who does not entertain a very great respect for the National Association of the Brotherhood of Locomotive Engineers. It has long been regarded as one of the most intelligent and conservative of all the labor organizations of the country, and it has been a matter of much regret everywhere that such an organization should have been betrayed into the unjust and unnecessary "B. & Q." strike, which has so long interfered with the general business interests of the Union, both East and West. Especially has this been the case since the startling developments have been made in Chicago which have involved several of the members of the association in a deep, widespread and most criminal conspiracy, in which the lives of great numbers of innocent persons—men, women and children—were involved. The testimony, elicited by the open confession of two of the leaders, shows a long-existing plot of a most dangerous and desperate character. No well-informed man would for a moment think of holding the association responsible for such a criminal act, but the public cannot close their eyes to the fact that the conspiracy has grown out of most unlawful and violent demonstrations for which the Brotherhood is directly responsible.

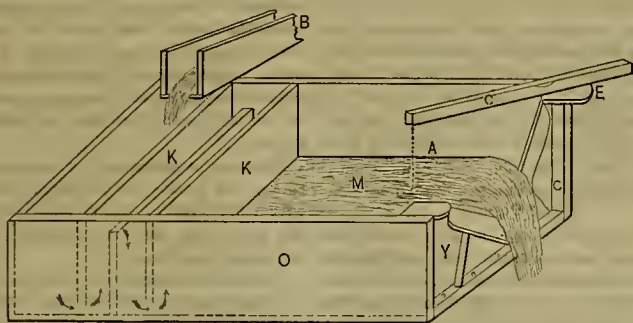
The strike has long been practically a failure, and there is no possible hope for any other result—in the nature of things there cannot be. Hence, for the sake of the general public and all concerned, would it not be well for the Brotherhood to officially accept the actual situation and declare the strike off? A prompt act of that kind would help the credit of the association and put a stop to any further criminal attempts against persons or property. Mr. Arthur, the head of the organization, is said to be in favor of such a course, which, under present circumstances, would give evidence that the methods of the Brotherhood are legitimate and law-abiding.

There can be no possible contingency under which the least excuse exists for any attempt to right a wrong which must involve in its consequences the lives of innocent women and children. There must be no excuse for dynamiters anywhere; the full force of the law should be meted out to them. The dynamiters connected with the railroad strike in this city a year ago made it impossible for that movement to result in success. So it will and should be everywhere.

THE RAILROAD IN TURKEY.—The railroad has found its way into Turkey and threatens such a revolution among the Turks that they would stop its progress if they dared to do so. But there is too much enlightenment even in that benighted land to rule it out. The car of progress cannot be stayed in its course, notwithstanding it threatens dire calamities to the Sultan's gates and rule. The only safeguard of despotism is comparative ignorance and isolation.



DISCHARGE OVER THREE-
INCH PLANKS.



CONSTRUCTION OF TRIANGULAR WEIRS.

inches above the opening, or nine inches above the center. The bottom of the apertures is on a level with the bottom of the box, and the board which regulates the pressure is a plank one inch thick and seven inches deep. Thus an opening 250 inches long and four inches wide, with a pressure of seven inches above the top of the orifice, will discharge 1000 Smartsville miner's inches. Each square inch of the opening will discharge 1.76 cubic feet per minute, which approximates the discharge per inch of a two-inch orifice through a three-inch plank, with a head of nine inches above the center of the opening, the said discharge being 1.78 cubic feet per minute. The Smartsville miner's inch will discharge 2534.40 cubic feet in 24 hours, though in that district the inch is reckoned for 11 hours only.

The miner's inch of the Park Canal and Mining Company, in El Dorado county, discharges 1.39 cubic feet of water per minute. The inch of the South Yuba Canal Company is computed from a discharge through a two-inch aperture, over a 1½-inch plank, with a head of six inches above the center of the orifice.

At the North Bloomfield, Milton and La Grange mines the inch has been calculated from a discharge through an opening 50 inches long and two inches wide, through a three-inch plank (outer inoh chamfered) with the water seven inches above the center of the opening.

Experiments at Columbia Hill.
To determine the value of this miner's inch, a series of experiments was made at Columbia hill, latitude 39° N., elevation 2900 feet above

feet above the level of the sea, to determine the value of the inch thus delivered in the claims. The results here given are the mean of a series of gaugings taken from nine different apertures, discharging in the aggregate 1800 miner's inches.

The water was drawn directly from a flume and discharged into a small reservoir, across the lower end of which was fitted a gauge. The velocity of the water issuing from the flume was broken by several drops as it entered the reservoir, and the gauge at the lower end was raised sufficiently to prevent any flow due to an increased velocity which might have been acquired in the flume.

The level of the water was determined with a Boyden's hook.

The discharge from the module was caught in a flume and conducted to a box fitted and leveled for the purpose. Time was read to one-fifth of a second. The following results were obtained :

One miner's inch discharged in one second .02499 cubic feet; in one minute, 1.4994 cubic feet; in one hour, 89.9640 cubic feet; in 24 hours, 2159.1460 cubic feet. Effective coefficient of efflux, 59.05 per cent.

An experiment on a single aperture of this form, made by Hamilton Smith, Jr., gave a discharge of 2179 4 cubic feet per miner's inch in 24 hours. The 2230 cubic feet of the North Bloomfield inch can only be considered an assumed rough estimate of discharge in 24 hours for one miner's inch.

Mr. Bowie gives in his book (published by

The Value of the Lumber Product.

Very few people, we opine, have any adequate idea of the importance of the lumber interest of the country, or of its value as compared with our other leading industries. We append a few figures compiled by the Bureau of Statistics at Washington of the various products of the year 1883:

Forestry.....	Value.....
Corn.....	\$700,000,000
Wheat.....	679,713,499
Hay.....	474,291,850
Cotton.....	371,811,084
Oats.....	280,266,242
Gold and silver.....	160,243,565
Coal of all kind (tons).....	174,400,000
Iron ore.....	194,500,000
	29,470,000

Corn is frequently alluded to as the most important agricultural product of the country, and the one of the greatest value; but in 1883 the lumber output exceeded in value the corn crop by nearly \$21,000,000! At the present time, without doubt, the excess in value of the lumber output is much greater than in 1883, and far more rapidly increasing. In connection with the above we append the following further interesting facts about lumber:

To the great Northwest, within the last two decades, millions of dollars have been sent for investment; miles of railroad have been built; hundreds of families have moved there and made homes—and yet, in a climate far more hospitable, in a section of country not nearly so isolated and so sterile, some of the finest timber lands, hard wood and pine, have gone begging at \$3 an acre! The census is not an interesting reading matter to most people, but it is instructive, nevertheless. From it we learn that in 1880 there were 259,959,159 acres of forest land in the Southern States—more than the total improved land in farms in all the States in the Union, leaving out Illinois. It is safe to say that 80 per centum of these 259,959,159 acres is in virgin timber. Two hundred millions acres of woodland! There are, in the Northern States and Alaska, about 180,000,000 acres, so we lead the North by 20,000,000 acres—and Alaska will not be a lumbering country for many a year yet, it is to be presumed.

In 1880 the South produced about \$45,000,000 of sawed lumber, which was not a bad showing when it is remembered that the machinery up to that time was exceedingly primitive. The next census will show an increase that will astonish every one. The sawmills in the South are run by mechanics—by men from Indiana, Ohio and other timbered States, and they have a keen knowledge of the business and know just what they are doing. They have the best circular and hand sawmills to be found in this country. There are more hand sawmills south of the Ohio than there are north of it. They out to the best advantage and shape the lumber as wanted. Sawmilling in the South is in its infancy, but strong enough to stand alone. The timber is cheap, of fine quality, and can be bought in any quantity wanted.

Master Mechanics' Association—Locomotive Construction.

The American Master Mechanics' Association held its annual meeting at Alexandria Bay in June. The work of this association is largely one of education. Much of the time of the association was taken up in discussing the subject of locomotive construction and management, a business in which improvement can be realized only by the most tentative processes and at the expense of much observation and patience. "Standards in locomotive construction," says a mechanical contemporary, "can only be satisfactorily established as a result of careful and extended observation, made by many men, and under a great variety of conditions which indirectly affect the results. It follows that conclusions must be drawn after mature consideration, or they will be worthless. The master mechanics are wise in proceeding with caution in this respect. A step backward will halve a dozen steps forward. The association cannot afford to go backward. To do so would, in every instance, seriously impair its usefulness. The association is working along slowly in the adoption of standards; those who think greater speed should be made in this direction can hardly have studied the question closely.

The American Machinist, in alluding to the meeting of the association, says: "Locomotives are worked in different parts of the country under widely different conditions, and it is a serious matter to adopt any single detail that shall fit all these conditions, or shall be a satisfactory compromise. The opinions expressed in the replies to the queries of committees appointed to investigate different subjects, and the discussion of the reports of these committees, show what wide difference there is in the experience of dif-

ferent men, who have, presumably, carefully made investigations. Of course this difference of opinion is generally due to the influence of something extraneous, but this does not make the task of getting at exact fact; upon which to build any the less easy of accomplishment. Those who have devoted much time to experiment know how difficult it is to eliminate those things that have a real but not desired connection with the question under consideration. In locomotive operation it is practically impossible to make all the conditions, save one, uniform; hence the difficulty of correct observation."

UNNECESSARY DESTRUCTION OF SALMON IN ALASKA.—We learn from Mr. Jonathan K. Hoag, who arrived in this port on Saturday last per steamer Dora from Alaska, that it is the custom at the salmon fisheries at Kodiak, and presumably at other places in Alaska, to place boards entirely across the streams in such a manner that the salmon cannot pass them on their way up the stream to spawn. The streams thus become literally filled with fish, which, in their frantic efforts to pass the obstruction, butt their heads against it until their noses or the side of the head is so worn off that the fish die. In most of the catches great numbers of fish are also so injured that they become useless for canning. In these ways nearly as many fish are wasted as are saved. Such a practice, besides being unnecessarily destructive to the fish, is barbarous in the extreme and calls loudly for some fish law which shall properly protect the fisheries of that Territory. We understand that the fish are already getting scarce in some localities in the Territory from wanton destruction and unnecessary interference with the progress of a reasonable number of fish to their spawning-grounds.

PACIFIC FISHING RESOURCES.—The fishing resources of the Pacific Coast are being rapidly extended. In addition to salmon, codfish and other largely utilized varieties, that large and delicious fish, the halibut, is now found in great abundance. The Gloucester halibut fishers are making arrangements to put vessels in the business on this coast, and send fresh halibut by fast freight to the East. The growing scarcity of this fish in the Atlantic, and its great abundance in the Pacific, will render such a business profitable. The abundance of these fish here has just been demonstrated by a catch in 15 days of 50,000 pounds by the Mollie Adams, a schooner which recently arrived here from the Atlantic Coast to go into this business off the coast of British Columbia.

EFFECT OF GLASS UPON WINE.—It has been discovered in France that glass bottles in which wine is kept sometimes affect its quality. Poligot, a chemist, says that the changes which wine kept long in bottles undergoes is due to the action of the ingredients used in the preparation of the glass. An undue admixture of lime and magnesia, which are often substituted for soda and potash, being cheaper, act injuriously upon the wine. In those bottles in which the wine actually improves, the proportion of lime is found not to exceed 18 or 20 per cent.

EXTENT OF DAMAGE TO FRANCE BY PHYLLOXERA.—The phylloxera, since its first appearance in France, 12 years ago, has desolated one-half of all the vineyards in the country. The actual money loss to the country is variously estimated at from one and a half to two thousand millions of dollars! The area actually destroyed is set down at two and one-half millions of acres, with damage to others, still partially productive, of at least half a million more, making an aggregate loss of 3,000,000 acres. And still the work of destruction goes on.

COAL FROM JAPAN.—The American bark Sunbeam recently arrived at this port from Kobe, Japan, bringing a cargo of 1320 tons of coal, consigned to J. D. Spreckels & Bros. This is the first cargo of Japanese coal ever brought to this port. This looks like opening up a new source of coal supply for this city. Japan is well known to be bountifully supplied with this carboniferous mineral.

SAFE AGAINST SHELLS.—It is reported from London that the French authorities, in view of the recent discoveries of explosives, have decided to use metallic casings for fortifications, with a kind of cement called bethunage, against which shells are powerless.

The Production and Uses of Borax.

Borax—borate of soda—was known to the ancient Greeks and Romans as *nitrum*. Its first mention by the alchemists was in the 10th century. Its chemical nature was first made known by Geoffroy in 1732. The common hexagonal crystals of borax, according to Dana, consist of 47.17 of water, 16.25 soda, and 36.58 of boracic acid. It sometimes occurs native in crystals, sometimes in concrete lumps. It is found in various parts of Asia and North and South America. It is mostly produced from the natural product, boracic acid. It was originally brought commercially from a salt lake in Thibet. Pure borax is a white substance of sweet taste, soluble in twice its weight of boiling water. It melts by heat into a porous mass. When at a temperature of redness, it runs together into a transparent glass, called glass of borax.

The refining of crude borax has been conducted in the seaport towns of the Mediterranean from the early times of ancient Greece.

The volcanic regions of Tuscany were for many years the chief source of supply of this product for Europe. That region commenced its supply about 1818. For the first ten years it turned out in the aggregate only about 750 tons; the next ten years the works produced 7000 tons. From that time the product was gradually increased up to 1846, when the annual output was 1500 tons.

The Varying Price of Borax.

About 1848 or '49, much apprehension was felt lest the natural supply of the article should give out. This fear was chiefly induced from the fact that the material from which it was obtained had for several years been becoming less and less productive. The foreign matters which it contained averaged for many years only about eight per cent, but about 1850 those impurities increased to fully 25 per cent. As a consequence of this uncertainty the price was about doubled, and refined borax sold in 1850 as high as 60 cents a pound; but confidence in its yield having been restored, it gradually dropped from that figure to 40 cents in 1857, and 23 to 25 cents in 1859. That figure was quite constantly maintained until 1869, when the California product began to come into the market, upon which the price again began to drop, finally reaching 12 to 15 cents in 1874, and 7 to 8 cents in 1878 and '79. In May, 1887, it dropped to 5 and 6 cents, but is now, July, 1888, quoted at about 9 cents.

Its Production on the Pacific Coast—A New Deposit.

The production of borax on the Pacific Coast is at present confined to California and Nevada. But what is supposed to be a very extensive deposit is about to be opened directly upon the ocean coast in Oregon and about 15 miles north of the California line. This deposit is a somewhat remarkable one, being imbedded in a dry bluish composed largely of blue clay in such a position that small vessels can anchor within less than a mile of the deposit.

The production of borax on the Pacific Coast commenced about 1860. Sixteen years later, in 1876, the yield had increased to a little over 5,000,000 pounds. During the next ten years—up to 1887—the production increased from five to within a fraction of ten million pounds, while the importation into the United States has fallen off to less than 5000 pounds.

In addition to the almost total supply for the United States, the Pacific Coast, in 1886, exported to foreign countries 2,042,012 pounds, of which amount 1,964,283 pounds went to England.

The Early Uses of Borax

Were chiefly confined to metallurgical operations as a flux. In brazing, welding and soldering, it forms a thin, fusible protection to the bright, metallic surfaces which it is desired to unite. It has also long been used as a flux in assaying. It is now largely used in glass manufacture, and to some extent in medicine and the manufacture of gems.

Its Future Uses to be Greatly Enlarged.

The virtues of borax are even yet but comparatively little known to the world, and much study is being made at this time by scientific men for new uses to which, under its present low price, it may be economically applied. In the near future and under the still further reduced prices which will probably be met, a much more extensive consumption than now obtains will undoubtedly be met with.

According to an article which lately appeared in the *Alta* of this city from the pen of Mr. Arthur Robottom, an English gentleman, who has given much careful attention to this matter, Prof. Schnetzler and Mons. Dumas of the Paris Academy of Science have given publicity to various new uses to which borax may be applied. Mr. Robottom himself has also experimented largely in this direction, and now expresses himself as being fully convinced that borax will soon become one of the leading articles of commerce in the States of California and Nevada. The great use of it has been in the manufacture of the glaze on earthenware, but in future it will be used for a thousand purposes—one of the most important will be the washing of linen, calicoes, flannels, and all woolen goods, etc.

Mr. R. says: I have had it tried and thoroughly tested in various work-houses, hospitals, prisons and other public institutions in this country, and in all cases the reports are most favorable. Two ounces hoiled in 12 gallons of water for washing will make clothes cleaner and whiter than soda or washing-powders, and does not injure or rot the material; the colors in print are not the least affected when washed with borax; it saves half the soap, and the best of all, it does not injure the washer woman's hands, but heals any sores. [We have no Chinamen in England to do the washing, as we have in California.] Two ounces of it hoiled in a pint of water (all solutions of it should be hoiled) cleans marble, removes the stains and dirt, and is most useful for cleaning paint, without removing it; cleaning printer's type, jewelry, plate-glass windows, taking stains out of decanters, and for making vegetables beautifully tender and green. A small quantity put into the tea kettle extracts the strength and improves the flavor; mixed with a little camphor, makes a splendid hair-wash; put into the water that barbers use, makes shaving easy; makes bad water good for drinking purposes; removes stains from the hands; kills bugs and destroys the fungus that is so injurious to the vines, and kills the spawn of frogs and other small fry; a small quantity put into milk prevents it going sour; kept air-tight, it will retain the scent of new milk for months. I have hoiled two ounces of borax in a pint of water, placed grapes in the solution when cold; the color is perfect and the grapes are preserved, but the flavor is not equal to fresh-gathered grapes.

Fruit can be preserved in a strong solution of borax, and meat will not putrefy if covered with a dry powder. Some pork pickled with dry borax kept well for more than a month, but was not palatable.

Two ounces of borax will go as far in washing or cleansing as a pound of soda. Borax placed in steam boilers prevents their becoming encrusted. It is used in England to repair millers' grinding-stones, for enameling watch and clock faces, in the manufacture of edge tools, in electro-plating by brisiers, and by hatters in cleaning raw silk, in the fining of metals and enameling iron, and in India for making fine steel. It will cure toothache, preserve the teeth, cure sore throats, is good for rheumatics, makes a cooling drink in hot climates, prevents chilblains, and preserves the most delicate fruits from the tropics.

The work of production is still going on in California, as will be seen from the following for this year up to July 23, 1888: Receipts for January, 479,000 pounds; February, 396,700 pounds; March, 648,000 pounds; April, 623,700 pounds; May, 1,317,700 pounds; June, 957,700 pounds; July, to date, 152,300 pounds. Total, 4,422,800.

IRISH WOOLENS IN AMERICA.—It is said that a syndicate of 14 woolen-mills in Ireland has agents in this country selling the product. The agents say they are competing successfully in this market with the goods of England, Australia and Scotland. The mills are operated by water-power, and they employ 2800 persons, nearly all girls, who receive \$3 a week.

RUSSIAN FLAX.—It is claimed that Russian flax is an improvement over our common American variety; that the seed is more abundant, larger, and yields a larger per cent of oil, and also that the fiber is superior. We know of no instance of its cultivation in this State. Should he pleased to hear from any correspondent in regard to the matter.

The Fraser Wine Process in France.

Most of the Algerian wines, especially those made from vines raised on the lowlands, have a musty or earthy taste, which is very detrimental to the wine and which could not heretofore be got rid of and made ready for use except by allowing the wine to age in cellars for a period of at least two years. As the wine product of Algeria exceeds 50,000,000 gallons annually, the loss of interest on the cost of the wine added to the loss by evaporation represents a very large sum.

M. Julien Pignet of St. Chamond, Loire, France, having become familiar with the Fraser process for aging wine and being duly authorized to do so, determined to try the virtue of that process for the treatment of this kind of wine. Accordingly, on the 1st of April last, M. Pignet put under treatment several varieties of wine as follows: Red Bordeaux wine of 1886, and Burgundy wine of 1886, and two lots of Red Algerian wine—one of the vintage of 1886 and one of the vintage of 1887, which last, of course, could not have been more than about six months from the press. The result was given in his own words as communicated to Dr. Fraser of this city:

"After 25 days' treatment we examined the No. 1 Algerian wine. To my great joy the wine was quite transformed. It had lost the taste of terroir. It was soft and agreeable to the palate, having lost the hardness of new wine; the person who furnished me with the wine imports wine from Algeria. He would not believe that it was possible to ripen and age wine in glass vessels. When he compared the treated wine with that not treated, he was greatly astonished at the result." After a long letter M. Pignet adds the following postscript: "I am pleased to tell you, before posting this letter, that we examined the No. 3 Nevada Algerian wine, and that the success has been as complete as the No. 1. The most important result of these two experiments has been to prove that the bad taste of these Algerian wines disappears completely by the effect of the treatment."

The Merchant of this city, in commenting upon the above, says: "Evidence is accumulating every day of the immense value of Dr. Fraser's discovery. It certainly cannot fail to revolutionize the wine industry of the world, for nobody can afford to keep wine in cellars two or three years and suffer a loss of 20 per cent by evaporation and handling, besides the loss of interest on the cost of the wine, the cost of cooerage and cellars, besides labor and insurance, while by the 'Fraser process' the above losses and expenses can be mostly saved and the wine fitted for sale or use within 30 days."

A Crucial Test in this City.

In connection with the above, we would add the following note from Mr. Thomas Penlington of this city. Mr. P. writes, under date of June 6, 1888, to Dr. Fraser as follows:

Of all the numerous tests to which wines treated by the "Fraser process" have been submitted, one of the most important to my mind was in my own cellar, at 123 O'Farrell street, in this city.

Two tanks containing 105 gallons each were filled with wine on the 26th day of June, 1886. One was filled with Zinfandel claret, and the other with Gutedel white wine, both made by J. H. Drummond, Esq., of Glen Ellen, Sonoma county, of the vintage of 1885. After the wine was under treatment about five weeks, it was put into barrels and kept in the cellar. No attention was paid to it whatever. It was neither racked nor were the barrels filled for a period of 20 months. It was expected that the wine had spoiled, yet upon examination, to my great surprise, both kinds were clear, bright and sound, and possessed the bouquet and flavor of ripe old wines. The barrels had lost by evaporation at least four or five gallons each, consequently lacked that much of being full, yet the wine had kept perfectly under those unfavorable conditions.

On the other hand, the samples of the untreated wines that were kept under equally favorable conditions, had entirely spoiled. This experiment proves very clearly, to my mind, that not only bouquet and flavor are developed by the process, but the wine is preserved against secondary fermentation and a liability to spoil under the most unfavorable conditions.

THOS. PENLINGTON.

San Francisco, June 6, 1888.

The above letter of Mr. Penlington goes to show that the process has the effect to chemically change the nitrogenous substances in the wine so that they become incapable of fermentation or decay. No new wine containing them would fail to spoil if kept a year and eight months in barrels not full, or lacking four or five gallons of being full. This seems to be a very strong point in favor of the "process."

As a still further evidence that the "Fraser process" produces the results above shown, we would state that our attention has been called to the condition of two drinking glasses which were nearly filled with claret wine of the vintage of 1886, and allowed to dry with a covering of thin cloth over them. The two samples were from the same barrel, but one was treated about four weeks by the "process" and the other was not. The bottom of the glass which contained the "treated" sample was covered with a bright, glossy sediment, the odor of which was sweet and pleasant. On the other hand, the bottom of the glass which contained the sample

not treated was rough and covered with a green mold. The smell was like that of decaying vegetable matter.

The power of the "Fraser process" to develop bouquet and flavor in a most wonderful degree has been universally acknowledged, and now the aforesaid tests go to show quite conclusively that it preserves the wine against germs, decomposition and decay.

We are of the opinion that the vast importance of the new discovery to the wine and liquor industries of the world cannot be fully estimated.

SHOP NOTES.

A Tool for Under Planing.

No one who has ever had much planer work to do on the under side of surfaces, such as the projecting parts of lathe beds, which must be planed for the carriage gibs to work on, will fail to appreciate the tool for this purpose devised and used in the Springfield Machine Tool Co.'s shops at Springfield, Ohio. It not only obviates the necessity for standing by and lifting the tool, and bolting it up during each back stroke, which is always a very irksome pastime, but lessens the liability to accidents, and in the end reduces the cost of tools.

The tool consists of a square shank held under the tool clamps of the planer in the ordinary manner, and having its lower end enlarged and a hole bored through it for the reception of a shaft, which, at its outer end, carries the tool.

The shaft is a good working fit in the bar, and is made to turn slightly in it, its motion being limited by a short pin which is driven into the collar of the shaft, and enters the circular slot milled in the side of the bar. When the tool strikes the cut the pin is forced up to the end of the slot, but during the back stroke a small spiral spring inserted in the slot behind the pin allows the shaft to turn back sufficiently to relieve the tool, restoring it to its place again before the next cut commences.

With this tool the clapper can be clamped down, and the work proceed with all the convenience and comfort attending the doing of any other kind of planer work, and without the fear of the tool catching and wrecking something. On account of the tool being so much easier and more simple to forge and grind than the ordinary hook tools used for this kind of work, it will probably prove cheaper in the end to use this new device.

It is made entirely of tool steel for the sake of rigidity, and it would be necessary to have two of them (or at least two bars), one for right and the other for left hand work. But if the projection or nub be left off the side of the bar, and a slot milled in each side, the shaft can be taken out and put in from the opposite side, and it will then work either right or left hand, but this, of course, would shorten the bearing of the shaft in the bar and be at the expense of stiffness, besides being more trouble to rig up.

There are no restrictions upon its use by any one who chooses to make one, and there are many shops where it would pay to make and use them.

KEEPING TOOLS.—Keep your tools bandy and in good condition. This applies everywhere, and in every place, from the smallest shop to the greatest mechanical establishment in the world. Every tool should have its exact place, and should be always kept there when not in use. Having a chest or any receptacle with a lot of tools thrown into it promiscuously, is just as bad as putting the notes into an organ without regard to their proper place. If a man wants a wrench, chisel or hammer, it's somewhere in the box or chest, or somewhere else, and the search begins. Sometimes it is found—perhaps sharp, perhaps dull, maybe broken; and by the time it is found he has spent time enough to pay for several tools of the kind wanted. That habit of throwing every tool down, anyhow, in any way, or any place, is one of the most detestable habits a man can possibly get into. It is only a matter of habit to correct this. Make it an inflexible end of your life to "have a place for everything and everything in its place." It may take a moment more to lay a tool up carefully after using, but the time is more than equalized when you want to use it again, and so it is time saved. Habits, either good or bad, go a long way in their influence on men's lives, and it is far better to establish and firmly maintain a good habit, even though that habit has no special bearing on the moral character; yet all habits have their influence. Keeping tools in good order, and ready for use, is as necessary as keeping them in the proper place. To take up a dull saw, or dull chisel, and try to do any kind of work with it, is worse than pulling a boat with a broom, and it all comes from the same source as throwing down tools carelessly—habit. Nothing more nor less. To say you have no time to sharpen is worse than outright lying, for if you have time to use a dull tool you have time to put it in good order.

—Manufacturer and Builder.

GIVING STEEL A LUSTERLESS POLISH.—A finely polished, lusterless surface on tempered steel can be procured by either of the following operations: After the steel article has been tempered it should be rubbed on a smooth iron surface with some pulverized oil-stone until it is perfectly smooth and even, then

laid upon a sheet of white paper and rubbed back and forth until it acquires a fine dead polish. Any screw-holes or depressions in the steel must be cleaned and polished beforehand with a piece of wood and oil stone. This delicate, lusterless surface is quite sensitive and should be rinsed with pure soft water only. A more durable polish is obtained by first smoothing the steel surface with an iron polish and some powdered oil-stone, carefully washing and rinsing. Then mix in a small vessel some fresh oil and powdered oil-stone, dip into this mixture the end of a piece of silder pith, and polish the steel surface with a gentle pressure, cutting off the end of the pith as it commences to become soiled. In conclusion it should be thoroughly cleaned in soft water, when the article will be found to have a fine, lusterless polish. —Manufacturers' Gazette.

GRINDING TWIST DRILLS.—Twist drills, says the American Machinist, should be ground to such an angle as will give them a straight lip; and this angle varies in different makes of drills, being determined by the shape of the cutter used and the angle of the spiral. A drill which, when ground at one angle, will have a straight lip, will, when ground at another one, have a curved lip, and manufacturers use such a combination of shape of cutter, angle of spiral and angle of lip, as to produce a straight lip. A recent correspondent of the Machinist, Mr. Geo. R. Stetson, says that 31° is assumed as the proper angle, and as Mr. Stetson is the superintendent of the Morse Twist Drill and Machine Co.'s Works, it is to be presumed that their drills have straight lips when ground to that angle. It has been claimed, however, that 29° 30' is the best possible angle. It is probable that the best angle for general purposes is about 30°. But circumstances sometimes change this. For instance, if the holes must be started from a center-punch mark, a drill ground to a much sharper angle will have less tendency to "run," but after it gets fairly started, and especially if it is to encounter hard spots or blow-holes, it will go much straighter if ground quite flat. You will find, however, that most drills are so made that when ground to about the angle we have mentioned, the lips are straight, and for general purposes it is probably best.

WATER COOLER.—One of the very best methods to keep water cool in our warm climate, without ice, was shown a few days ago, while visiting a raisin farm not far from town. The way is an inexpensive one. A common good-sized barrel, without top, was filled with water. This barrel again was set inside a larger sugar barrel, and the space of two inches between the two barrels was filled with coarse wooden shavings. These were kept constantly wet, every one drinking pouring the balance of the water in the cup over the shavings. The water in the inner barrel was next to ice cool, without having that peculiar chill so general and sometimes dangerous in ice-water. We have seen barrels, kegs, stone jars, etc., wrapped with sacks, canvas, blankets, etc., but none of these kept the water as cool, or were as easily kept, as the double barrel described above. We recommend every farmer, vineyardist, or family in town, who cannot afford ice, or live too far from the supply, to try this water-cooler. It will give you satisfaction. —Fresno Examiner.

THE DETECTION OF HOT BEARINGS.—M. Gerhuz, it is stated, has devised an apparatus by which an audible and visible signal is given to the engineer if any part of the machinery to which the apparatus is fitted should become unduly heated. In its simplest form, as applied to the crank pin of a steam engine, the device consists of a small cylinder fastened to and projecting from the crank pin, and containing a plug of easily fusible alloy, which is pressed against the crank pin by a perforated piston and spring. The piston rod, by means of a lever, controls a catch belonging to the mechanism of a bell placed over the apparatus. The gear of the bell, which is actuated by a spring power, is previously wound up by hand and locked by the catch. If the crank pin should become heated, the fusible plug melts, thus allowing the piston to descend, thereby releasing the catch and sounding the bell. In addition to this audible signal, a disk hidden underneath the bell is turned in such a position that a bright color is seen through two holes in the disk of the bell.

HANDY MIXTURE FOR A MACHINE SHOP.—It has been stated that soft soap, with half its weight in pearl ash, one ounce of mixture in about one gallon of boiling water, is found of great practical value in engineers' shops, in the drip pans used for turning long articles bright in wrought iron and steel. The effect of this mode of treatment is that the work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted, retaining their polish.

A NEW MACHINE for rapid manufacture of wooden conveyer flights has been designed by Mr. C. L. Redfield, of Redfield & Haherlin, mechanical engineers, Minneapolis, Minn. This machine performs every operation automatically, from receiving the rough strips of wood to dropping out the finished flights. Heretofore this work has been done by six or eight handlings on as many different machines. This machine has recently been put into operation and

delivers the finished flights at the rate of from 20 to 30 per minute. An important advantage of the new machine is that the flights are much better finished than by the old process. As the machine is comparatively small, not likely to get out of order, and requires but one attendant, it seems destined to supersede present methods of manufacturing flights.

SECURE THE LOOSE JOINTS.—Many think that engineers pay too little attention to the necessity of securely fastening the flexible parts in moving machinery that are liable to vibration. Such parts act like a cutting instrument, and eventually wear into each other and into the permanent structure. Not long since a locomotive could be seen, built by a builder of some reputation, where the cab sheet, not being fastened to the boiler, had cut about half-way through the wagon top, almost rendering the boiler dangerous, and yet this locomotive had been built only a few years. The excessive noise about some machinery renders the squeak and noise incident to such wearing unnoticeable. It therefore escapes attention until the damage is done. Often under new engines one can hear strange noises. If the louder noises and sounds about machinery could be silenced, the magnitude of the squeaking and grating sounds would be surprisingly apparent.

NO TWO MEN DO WORK EXACTLY ALIKE; every good workman has ideas of his own, and when he attempts to follow out ideas given by the foreman or some one else, he is pretty sure to make a "botch" of it. General principles are the same, but the details should invariably be left to the workman himself, otherwise he not only loses confidence in himself, but becomes a mere machine which requires constant watching.

HOW TO USE BARBITT METAL.—Caution is given in an exchange against filling a box with barbit metal without first washing the box with alcohol and dusting over the surface with sal-ammoniac. Wherever a tinned surface is formed, cover the remaining surface of the box with clay wash to protect it against the attack of the fused metal.

STEAM BOILER NOTES.

Advantages and Disadvantages of the Surface Condenser.

Surface condensers began to come into general use about 1859. J. F. Spencer, in a paper read before the Institute of Engineers (Scotland), Feb. 5, 1862, gave the following advantages of a surface condenser:

1. Freedom from injurious deposits in boiler. Small amount of scale.
2. Since the boilers will be stronger, steam of a higher pressure may be used than is possible with the jet condenser.
3. The foulest water may be used as the refrigerating agent.
4. The supply of feed-water to the boilers is more regular than is possible when using the jet condenser.
5. The load on the air pump is uniform.
6. Gain in the use of fuel, as the loss from blowing off is from 15 to 20 per cent less when surface condensers are employed.
7. Boilers need not be cleaned so frequently; less wear, tear and expense.
8. Can use increased expansion of steam.
9. Heating surface of the boiler is more efficient, as there is less incrustation.

Disadvantages of a surface condenser:

1. Additional pumps and machinery.
2. Additional space occupied by the machinery.
3. The use of the same water over and over again is held by some to corrode the boiler.
4. Complication of tubes, etc.
5. Liability to leakage.
6. Increased first cost of from 10 to 20 per cent, and increased cost of repair.
7. More refrigerating water is needed than for a jet condenser.

Proportions of Locomotive Boiler and Engine.

One of the speakers at the late meeting of the Master Mechanics' Association said that in his experience he had never found that a locomotive boiler was made too big for an engine. He believed in the maxim that, "Within the limits of weight and space to which you are confined, you cannot make the boiler too big or the beating surface too great." He continued:

"I would make the boiler as big as possible. First determine the size of the wheels, then proportion the cylinder to the wheels. You thus arrive at the weight of the cylinders and the working parts of the engine and you know what is left for the boiler. When you come to the matter of the relative size of the grate to that of the beating surface, then the matter becomes more complicated. The size of the grate is dependent upon the fuel used."

Another speaker agreed in a general way with the above. He said: "As a rule you can never get the boiler too large. And that is a very good plan he has outlined of designing the cylinder to suit the wheels and then making the boiler as large as possible. But unfortunately that has not been the plan usually fol-

lowed by our designers. The engineers, or those responsible for track and bridges, have generally said they want the weight on wheels to be kept down within a certain limit. The engine has to be designed to suit this, and the transportation department uses its influence to get as large cylinders as possible. Master mechanics are often induced to enlarge cylinders until they are out of proportion to the boilers and against their own judgment. The report of the committee here gives about 1300 square feet of heating surface for a 17"x24" engine. Every one understands it is a large proportion of heating surface to the cylinder capacity. The aim of the committee evidently is to encourage the designers of locomotives to make as large heating surface as possible, and also as large proportion of boilers to the cylinders as possible."

Feed-Water Heaters.

The question of the advantage, or otherwise, of the use of feed water heaters for locomotives was brought before the convention, with a request that those having experience in their use give the results. No one appearing inclined to answer, President Setchel called upon Mr. Paxton, who said, in substance, that it was well understood that there was no advantage in the use of feed-water heaters. This was not disputed, and was evidently the opinion of the members present when the question was asked.

Throttling the Steam Supply.

Every engineer who has given the subject any thought appreciates the evil effect of throttling the steam supply to an engine, and recognizes the importance of free, unobstructed steam connections. Were there, indeed, any doubt, a set of comparative indicator diagrams taken with the valve in the steam pipe wide open at one time and partially closed at another, would at once decide the matter, and show a very marked difference in the two cases in point of available mean effective pressure and steam economy. In stationary engine running this circumstance is, in general, duly considered, and willful throttling is comparatively rare, there being, moreover, no incentive to it. Examination into current locomotive practice, however, will reveal the consequently peculiar fact that throttle regulation—that is, controlling the speed of the engines by opening or partially closing the throttle valve, as the case may be—is there still used to the almost entire exclusion of the proper system of link regulation.

For a long time it has been endeavored to demonstrate to locomotive engineers the direct economy of governing their engines by the employment of the reverse lever instead of the throttle, and it would be a reflection upon their intelligence to assume that they did not fully comprehend the relative merits of the two methods. The fact that the use of the throttle continues in preference to that of the reverse lever and link, must, therefore, be explained simply by the undoubtedly greater convenience of the former method, and some system of rewarding economical engine performance would probably be the best means of bringing about the desired change.

As it now is, the greater number of locomotives, instead of being practically automatic engines, made to cut off at varying points in the stroke, according to the work to be done, by judicious handling of the reversing lever by the engineer, are made to operate on the principle of the ordinary throttling engine. Just what this difference amounts to as regards cost of running has been shown very strikingly on several occasions by trial figures. Particulars of a test, which we saw a few days ago, placed the saving of coal, when running with the throttle wide open and early cut-off, as compared with running under a late cut-off and a throttled supply, at fully 88 per cent. This case, we admit, is not entirely analogous to the one presented above, in which the locomotive may be considered alternately as an automatic engine and as a throttling engine, according to the management, still, it brings out the main point very clearly.—*Iron Age*.

PROPER THICKNESS FOR BOILER PLATES.—Sometimes owners to be over-safe will order a boiler made of very much too thick sheets, and in so doing they really make it dangerous. The heat of the flames which pass under the sheets must be passed through them to the water inside, and of course if there was no water inside, the sheets would be burned. Or if you were to apply a blow-pipe or a tuyere to the sheets, you would burn or melt them, because the plates would not carry the heat through them as fast as the water would carry it away once it got it. In the same way, if the plates are much too thick, the rivet heads will be liable to be burned and the shell itself injured upon its outside surface. Going to the other extreme, there is no economy in making a boiler of plate much thinner than one fourth inch, no matter what pressure it is to carry nor how small its diameter may be, because sheets much thinner than one-fourth inch cannot be calked well, and you will lose as much in the repair bill and in the leakage as the extra weight of metal would have cost. The mere fact that a boiler is made of 60,000-pound iron, or of best boiler steel, does not give you any guarantee that it will last long, or remain tight. It may be of such design that the different parts will expand and contract unequally, and may wrench itself to pieces in a very short time. Or, parts of it may be exposed to steady heat and not get any cir-

ulation, and hence get burned out in short order; or riveted seams may be torn down in the fire instead of being kept above the water line and out of the heat of the flame. Or the boiler may be designed and made all right, and yet be placed in some "black hole of Calcutta," and not have light enough to be inspected through and through, and hence may be allowed to develop some defect which will cause its ruin—all for lack of a little attention and repair.—*Grimshaw*.

ENGINE FOUNDATIONS.—There is not a detail in engine construction and operation that merits greater consideration or is of greater importance to the successful working of an engine than the foundation upon which it stands, and too much care cannot be accorded it, that it shall have ample spread, stiffness, unity and adaptability to the movement and operation of the parts which it supports. It should be so bonded and tied that unequal settlement shall not take place, and the height, weight and base should be of such proportion that when the engine is in full operation there shall be no swaying or twisting of the parts, no heating of the journals, no springing or tremor of the bed, arising from an unsuccessful transmission of the strains. The higher the speed and revolution, the stiffer and more solid should be the foundation, and the greater the base contact with the supporting earth. A good foundation will often decrease the defects of a poor bed, provided, of course, that such engine-bed be properly and thoroughly bolted to its foundation. When properly constructed and tied together, the engine-bed and its foundation should be portions of one complete whole, inseparable and undisturbed in their relationship by the movement of the engine parts while at their hardest work.

A LONG RUN BY A STEAM ENGINE.—Very long runs made by a steam engine are considered rare, and long runs have heretofore been considered several days, or a few weeks. The Westinghouse engine has increased this time in many instances to a number of months. The last public notice of a long run made by a Westinghouse engine was a notable instance where a certain engine ran 11 months without stopping, at a speed of 300 revolutions. The most remarkable record, however, has recently developed in the Pittsburgh Gas Light Co., where a 10-horse power Westinghouse engine ran continuously for 13 months, running at about 500 revolutions per minute, and in that time making 288,000,000 revolutions without the throttle valve being shut, and it is still running. It seems to take Burgess to beat Burgess.

SENSIBLE AND SOUND.—Petr Gibbons, in the *American Machinist*, gets down to "hard pan" in a few remarks. He makes in reviewing the published accounts of the explosion of a boiler on a tugboat, that killed the man in charge of it, when he says: "A boiler explodes because the owner is too miserly to have it repaired or replaced, the 'inspector' is incompetent or can be bribed, and the engineer will not 'kick' too much through fear of being discharged." He might have added a "cheap engineer" (?) to his list; it would have rounded up his array and covered the whole ground. We are pleased to observe that our cotemporaries are beginning to devote space to this boiler-explosion question. It is time, and there is no question more deserving the attention of mechanical editors.

COMMENT IS NOT NEEDED.—A cotemporary says: An economical firm recently put in a boiler and a second-hand engine, having previously hired power. On a visit to the new establishment the boiler was found in a dark cellar, and to see the pump a kerosene lamp had to be lighted. This establishment had no engineer nor coal-heaver. When the speed went down somebody was sent to stir up the fire, and the principal of the firm said, "We pump in water twice a day." The boiler had a glass gauge and two gauge-cocks, but the glass was opaque from dirt, and the lower gauge-cock could not be opened by ordinary hand force—it had rusted in its seat.

ECONOMICAL PROGRESS.—One of our cotemporaries rightly observes that radical changes in the science of steam engineering have not been numerous in the last quarter of a century, but improvements in the details of construction and operation have been many and of high utility. How important this progress has been in its economical results is indicated by a statement recently made that railway trains in England are now driven at an average speed 14 per cent higher than 20 years ago, with but little more than half the quantity of coal.

INCREASED WORKING PRESSURE IN MARINE ENGINES.—In 1877 the ordinary working pressure in marine boilers was from 60 to 70 pounds per square inch, and under the then British Admiralty rules further progress was barred in consequence of the required thickness of steel plates. But these rules were modified, with the result that working steam pressures of 140 to 150 pounds per square inch are now general in marine boilers. It is held that such rate may be adopted with safety, and is of much advantage for all marine boilers.

A STEAM-POWER PLANT is divided into five fundamental parts by a French author—the boiler, motor, condenser, distributing mechanism and mechanism of transmission.

OUR LUMBER INTERESTS.

The Donahue Railroad Extension.

The Redwoods of Mendocino and Lake Counties.

A late number of the *Examiner* of this city furnishes the following facts and speculations in regard to the redwood lands of Mendocino, Lake and Humboldt counties, and the prospects of reaching them by rail:

For the sake of Lake county alone it would not pay a railroad to build into it, but once there the road would never stop till it had pushed on into the Mendocino redwoods. Mendocino county joins Lake on the west, but nevertheless very hazy notions appear to prevail as to the boundaries of the redwood belt and the opportunities of reaching it by rail. Mendocino county is divided by nature into two clearly distinct parts. The western half, extending from the ocean inland a distance varying from 10 to 25 miles, is covered with redwood timber. The eastern half, from the edge of the redwoods to the watershed, between Eel river and the Sacramento, may be described as open rolling hills, suitable for grazing, with three or four limited valleys, suitable for agriculture. The dividing line, running north and south between these two wholly different kinds of country, is the summit of the range that forms the watershed between Eel river and the ocean. That summit, which is unbroken by any pass low enough for railroads, maintains an average height of from 2000 to 3000 feet. In general the redwoods may be said to end with that summit and the open country eastward to begin; and though there are some small exceptions to this general truth, no considerable body of redwood is found on the east side of the range until a point is reached 60 miles north of Ukiah by any line of railroad that could be constructed.

In fact more than nine-tenths of the redwood timber of Mendocino lies on the west side of the summit of the range next to the coast, and is inaccessible from the east by any known method of getting it to market. Spurs run down to the sea from the summit of the range, dividing the whole region into a series of independent river basins. Access to each of these basins is obtained solely from their outlets into the ocean, and as these outlets could not be crossed by a coast railroad along the Mendocino cliffs at anything short of a colossal expense of time and money, it follows that the present method of shipment by schooners is likely to prevail for many years. Access to the redwoods, therefore, is not likely to offer many inducements to railroad building into Lake county when the real facts of the case are understood. As a matter of fact, the point 60 miles north of Ukiah, which has been already mentioned as the beginning of the inland redwood growth, could not be reached by a railroad from the head of Capay valley in less than 110 miles, and such a road would have to cross one, and possibly two, ridges, in addition to the watershed between Russian and Eel rivers. As the Donahue road, which throughout its present extent to Ukiah is practically devoid of grades, could reach the same point by crossing that watershed only; and as the Donahue road, moreover, has just been given connection with the overland system, it is folly to suppose that the experienced builders of the railroad now at the head of Capay valley would choose Lake county as a thoroughfare for the pleasure of hauling redwood lumber up and down hill. When redwood on the coast of Mendocino becomes scarce instead of unlimited, when the mills cut all they can find instead of agreeing among themselves to take turns in suspending operations in order to keep up prices, when railroads begin to think it worth while to build to the northern end of Mendocino for the sake of new redwood supplies, when all these things shall happen, then it will be found that the key to the problem of successful railroad extension to the redwoods is held by the Donahue road alone.

The railroad now almost at the head of Capay valley will not be induced to proceed up Cache Creek canyon either by the prospect of large freight returns from Lake county or by the idea of making that county a thoroughfare to the redwoods.

Railroad Strategy.

The Hopland gap is impracticable for railroads. The ascent from the west is too sudden to be overcome gradually, and the summit is 800 feet higher than Clear lake. The first gap suitable for a railroad occurs in the northwest corner of the Clear Lake basin at Blue lakes. There the natural passage across the watershed is lower than any other way of penetrating the Clear Lake basin except Cache creek. This low point in the divide is 14 miles from Lakeport and 16 miles from Ukiah. It will thus, within a very few weeks, be only 16 miles from the terminus of the Donahue railroad. The extension of that road from Cloverdale is now rapidly approaching completion. For years the road stopped at the canyon of Russian river, where 11 miles of heavy grading and three-quarters of a mile of tunnels have now been overcome, allowing comparatively easy progress through the Hopland and Ukiah valleys. Its terminus will soon stand at what is practically the head of Russian River valley. The length of the road from San Francisco, 114 miles, will correspond almost exactly with the length of the Southern Pacific Company's line to Ramey, at the head of Capay valley. Should the two roads—one from the East, the

other from the West—become competitors for entrance to the Clear Lake basin, one would be confronted by the rugged canyon of Cache creek, the other by the easy passage at Blue lakes. To occupy that pass by an extension of the Donahue road from Ukiah would be a strategic movement with a double significance. In the first place, it would block the outlet northward from Clear lake, whenever that outlet should come to be desired by any railroad entering the basin from the south. In the second place, the same extension that secured that outlet would control the means of crossing in the future to the headwaters of Eel river. For the watershed between Eel and Russian rivers can be unbroken only at a point northeast of Ukiah, in reaching which a railroad would first come to a point of junction with the route to Blue lakes. The control of one is the control of the other. Should a railroad coming northward through Lake county reach that junction first, it would immediately receive and control the whole of the freight from the Eel river country that now goes to Ukiah, for that same point is passed by the wagon road over which all the freight of Northern Mendocino is hauled, and there is no road with grade low enough for it to be hauled to Ukiah any other way. These, then, appear to be the gains for the immediate present which the Donahue road has secured by its extension of 30 miles to Ukiah.

Device For Handling Lumber.

A very useful device for loading lumber has recently been patented, which is described as follows: There are uprights, preferably connected together, and pivoted in pairs opposite to each other on either side of the track, so that the top ends of each pair project slightly above the level of the truck body, so as to support the carrying bolsters on which the lumber is piled, a snitable locking device being provided for the purpose of holding the uprights in a vertical, stationary position during the period that the lumber is being piled upon them, the locking device being so arranged that upon the truck being run below the bolsters it will unlatch the lock, when the uprights immediately turn on their pivots and drop the bolsters on top of the truck, which may then be moved on its track, carrying the bolsters with their load of lumber. An incline is located on the track, which performs the double service of raising the truck, so as to elevate the end of the locking arm, and to also raise the truck, so that it will have a tendency to run back on the track after it has raised the arm, and thereby unlatch the lock which supports the uprights in a vertical position. As soon as they are unlocked the uprights have a tendency to fall forward, bringing down the bolsters, together with the lumber on the top of the truck. Instead of requiring an empty truck to be shoved into position before the lumber pilers can proceed with their work, the uprights are merely pushed back into a vertical position, where they are locked, and a fresh pair of bolsters placed on the top of the uprights, when the piling can be proceeded with, and another load made ready for the truck after it has been cleared of the lumber previously carried away, thus saving one-half the number of trucks usually employed in the transportation of lumber and the work greatly facilitated. Mill-owners and dealers in lumber generally will see at once the value of this improvement. Wm. Way of Wilfred, Ont., Can., is the patentee.

LUMBERING IN CALIFORNIA.—Ex-Governor Alger of Michigan, while in this State last spring, manifested his confidence in our lumber interests by investing therein about \$500,000. The investment consists of redwood and eugarpine lands, mills, docks and schooners, most of the former being in the vicinity of Fort Bragg. It is regarded as a queer thing by California lumbermen that whereas last year the entire State cut but 190,000,000 feet of all kinds of lumber, ex-Governor Alger himself cut from his timber in Michigan and Wisconsin 150,000,000 feet. A well-known California lumberman said, as he contemplated these figures: "It is no use talking; we talk about what we are doing at lumbering, but we haven't got started at it yet. Our machinery is inadequate to the demands. We are behind. Another thing, we do not appreciate the value of this timber. One of these days we will wake up to find thousands of improved mills buzzing in every timber region of this coast, and a value attached to the timber that we never dreamed of." Ex-Governor Alger said he was astonished that while these fine timber lands were rapidly passing into the hands of strangers, the Californians paid no attention to them, while the lands, too, were lying at their very doors. "I find," said the ex-Governor, "a magnificent quality of timber here, but the methods of getting out and sawing it are rather behind the Northern regions. The machinery is inadequate to the demands of the forests and the opportunities generally for lumbering." The ex-Governor is highly pleased with his investments in timber here, and it is said that he will buy more of it.

THE SAWMILLS OF MINNEAPOLIS, up to January 1, 1888, turned out, for the season, 210,000,000 feet of lumber—50,000,000 short of the product of the previous year.

HEAVY SHIPMENTS OF SUGAR PINE.—The Shasta Lumber Company at Redding is shipping daily from that point about 33,000 feet of eugarpine lumber.

FLOUR MILL NOTES.

Crease Dirt in Wheat.

Considerable discussion has recently been indulged in with regard to crease dirt in wheat. By some it has been considered an important detriment to flour. An intelligent correspondent of the *United States Miller* writes upon the matter as follows:

"I speak for myself only when I most emphatically pronounce the crease-dirt theory a scare. I was impressed with the subtle arguments of the exponents of this theory, and verily believed it was there. In fact, I had what looked like ocular demonstration. A series of experiments on my own hook plainly showed me that there was no such thing as crease dirt in anything like the quantity to be detrimental to the flour; let that flour be the very cream of the patent. Any miller can readily determine the facts for himself. Take a kernel of well-cleaned wheat—cleaned as well as modern machinery can clean it—then place it on a sheet of pure white paper. Take your pocket knife (the best wheat-splitter in the world) and carefully divide the kernel through the crease. As all are well aware, no machine made can make as perfect a break (first) as this; hence the experiment, or the results of this same, should have weight. Take a good glass and examine well the divided grain. Along the edge of each half kernel is a dark streak. Your knife, or other fine implement, is brought into play, and you try to remove this streak. It cannot be done unless the bran is also removed, and a good examination of that bran will still show the dark streak. The fact is, it is the color of the bran in that particular part of the berry, the same as we will find different shades of color on the main portion of the grain. The most careful handling of a single kernel of wheat in this manner will produce a minute quantity of what looks like dirt. Your glass again, and you will find minute particles of bran broken or chipped off mixed with flour and fine middlings, and an extremely small quantity of dark stuff that for the sake of argument we will call dirt. Venders of machines for the special purpose of removing this dirt claim not over one per cent of break flour is made. If we should thoroughly separate this amount and put each of the different materials in a pile by themselves, we would find something like this: One-fourth of one per cent fine bran, $\frac{1}{2}$ fine middlings, $\frac{1}{2}$ flour and $\frac{1}{2}$ dirt. Admitting this one-fourth of one per cent to really be the secretions of the crease, what is gained by putting in expensive machinery to remove it? True, it will go in with the flour, but I defy the best known expert to see any change in the color of the flour where only one-fourth of one per cent of impurities was mixed with it. 'Tis like a drop of ink in a barrel of water; it neither changes the color nor alters the taste. Millers, however, are more fully understanding the matter at the present time. Many who have experimented have saved the extra expense of looking for a huzzard and finding a mosquito."

A PORTABLE FLOUR-MILL.—At the Millers' Convention, recently held in Buffalo, a portable flouring-mill was set up in front of the Genesee hotel by George T. Smith, the great miller. This plant, consisting of a handsome mill, in dimensions 26 by 30 feet, and 47 feet high, comprising three full stories and a basement, a grain elevator 16 by 20 feet in dimensions and of the same height as the mill, and a small office, was transferred in sections to Buffalo and all three set up, by permission of the city authorities, on the street opposite the Genesee and west of Main street. The mill contains a 45-horse power engine and all the latest improvements for milling and purifying. It is built in parts, the walls being formed of asbestos and iron, and its trip to Buffalo is but one stage of its journey to the coming Industrial Exposition at Paris, France. It was run continuously in Buffalo during the continuance of the Millers' Convention, its power being supplied from the Genesee boilers. Its owner, Mr. Smith, is the inventor of the "purifying" process in use literally in almost all the great flouring-mills of the world, and a man of wide inventiveness and great liberalty. His annual expenditures on costly exhibits of the miller's art have been estimated at from \$60,000 to \$70,000. The novel spectacle of a flouring flouring industry arising in the middle of the city and disappearing in three days, was a matter of considerable interest.

THE CONSUMPTION OF WHEAT in England for the last two years, according to English authorities, has not been at the normal average of $5\frac{1}{2}$ bushels per capita. The population of Europe increased from 239,000,000 in 1860 to 347,000,000 in 1886, or rather more than 20 per cent in 26 years, or less than one per cent annually. When consumption is normal, and industries are prosperous, the consumption of wheat should be augmented at least one per cent annually.

FLOUR-MILLS IN NEW ZEALAND.—There are, according to the latest official report, in New Zealand 121 flouring-mills, 47 using steam-power; 6 steam and water; 66 water and 1 wind-mill. These mills employ 448 persons. The total value of mill property is placed at about \$1,500,000.

Coast Industrial Notes.

The Astoria salmon pack is estimated at 330,000 cases.

The State Board of Forestry is to have an exhibit at the Mechanics' Fair.

The quartz-mill of the Jenny Lind gravel mine, not far from Grass Valley, was burned last week.

The new works of the Spring Valley Water Co. of S. F., now nearly completed, cost \$1,250,000.

The new sawmill of F. M. Ellsworth, near Colfax, Washington Territory, was destroyed by fire on July 23d.

The date of opening bids for furnishing annual supplies for Mare Island has been postponed until August 14th.

The Pomona cannery is putting up large quantities of crystallized fruit, for which there is a limitless demand in the East.

All the fruit-drivers of this city, Geyserville, Cloverdale, Halesburg and Petaluma are busy with an exceptionally large plum yield.

IRON MINES have been found 35 miles from San Diego, in the Eagle Pass mountain, and capital is being solicited to develop them.

A St. Louis firm, which has been awarded the contract for the windows of the stone church the Presbyterians are building at Portland, will open art-glass works at that point.

The first trip for halibut by the Eastern fishermen who have commenced fishing on this coast, resulted in a profit of \$10,000. A new smoke-house will be put up at Tacoma, W. T.

THERE has been some talk recently among California textile manufacturers of utilizing banana fiber, which can be brought up here from Central America at a very low cost of transportation.

THE Reese River *Reveille* says John Webster has bought and paid for the old Battle mountain copper mines, and will commence work as soon as hoarding-houses and other necessary buildings can be erected.

THE Willamette Pulp & Paper Co. of San Francisco (capital \$300,000) will begin building a mill shortly at the Willamette Falls, Oregon City. From 7000 to 10,000 cords of cottonwood will be used per year.

It is reported in the Virginia City papers that California capitalists have secured immense deposits of coal, limestone and iron at Iron City, Utah, and that large sums will be spent in putting up furnaces, etc.

MANY fine lots of beef cattle are now being shipped from Nevada to California. In Northern Nevada there are whole herds of cattle that are rolling fat. In one range, about the head of the Owyhee, there are no fewer than 80,000 fat cattle.

The old boilers and machinery from Jackson's lumber mills at Casper creek, Mendocino county, have been brought down on the schooner Maxim. The output of the mill has increased to such an extent that more powerful engines are necessary.

At Tacoma, W. T., the wheat warehouses are packed full of wheat, 12 bags high, and additional warehouses, occupying a distance of 1000 feet on the water-front, are being erected. Nearly all this wheat is from the Palouse country, in Eastern Washington Territory.

THE Redding *Free Press* says: The sugar pine lumber still continues to pour down from the flume, the Shasta County Lumber Co. having fitted up some of their newly imported wagons, making about 30 in all employed by them. Their average shipment is 2 $\frac{1}{2}$ carloads a day. Could load more, but cannot get the cars.

THE sulphur works at Oove Creek, Utah, were destroyed by fire on July 23th. The losses are as follows: Four furnaces, \$5600; two boilers, \$2500; one engine, \$1500; three mills, \$1200; balting, \$300; large building, \$3000; warehouse, \$1000; 250 tons of sulphur, at \$30 a ton, \$7500; total, \$22,600. The works had been lately shut down on an injunction.

THE ship *Irby* sailed recently for Liverpool. Among her cargo were 28,857 cases of salmon, the larger proportion of which was Sacramento spring catch. The balances were fall fish. Reports received from the Naas and Skeena rivers and other points in British Columbia are that salmon are running freely. All fears of a small pack this year are now done away with.

THE Virginia *Enterprise*, in speaking of the running of the California battery-mill by the Pelton wheel, says: The pressure at the wheel is 260 pounds and the height of the column of water is 616 feet. A stream of water running through a nozzle one inch and three-quarters in size, under this pressure, upon a Pelton wheel 11 feet in diameter, affords sufficient power to run 60 stamps.

THE Visalia *Times* says: Eight mechanics, lately from San Francisco, last week filed on two sections of timber land on White river, with the intention of settling there and working up the timber themselves. They intend to put in a small sawmill at an early date for sawing lumber, which they will manufacture into windmills, doors and blinds and other commodities needed in a country that is fast settling up.

NAPA is one of the most promising industrial centers north of the bay. The establishment of woolen-mills there has been followed by other industries, among them being the works of the Napa Fruit Drying and Packing Company, the Napa Pottery and the Valley

Wine Company. Other enterprises are now taking root, the most important of these new additions being the Napa Planing-Mills, which will have a well-equipped establishment at work within a month. The Hendy Machine Shops of this city recently sent up a 50-horse power engine and boiler for use in these mills.

Two new furniture factories—one on Bush street and another on Mission—have recently been added to the number of establishments of that kind in this city. When all the furniture factories, both great and small, are counted up, it is found that San Francisco now has nearly 30. It may be roughly estimated that these factories employ 2000 men. They own some annually about 10,000,000 feet of lumber, and the value of their manufactures is said to be about \$2,500,000.

In all probability a new cannery will soon be constructed in Oakland. A corporation has already been formed, composed of a number of prominent capitalists of Oakland, who propose to construct and conduct a canning establishment, and probably the site will be selected in or near Oakland. The object of the company will be to control the fruit from the ranches in the surrounding country, which is now sent to San Francisco and elsewhere.

THE manufacture of wood paper pulp is about to be undertaken at Mott, Tehama county. The best wood pulp is manufactured from white fir, of which variety of tree there is an inexhaustible supply in the canyons near the mill recently built at that place. The mill will be run by water-power. It is intended to supply as far as possible the demands of the paper trade of Northern California, and if a market can be found in this city some of the product will be introduced here.

A NEW source of macadam supply has been discovered near Mills seminary, back of Oakland. At present all of the rock used for macadamizing purposes in Oakland and Alameda is hauled down from the hills by horse teams, but that from the newly opened bed will be taken down by rail and can be laid down in either city at a much less cost than by the present means. The Alameda county railway, now being constructed, will soon be built up to the quarry, where crushers will be erected and the work of getting out the macadam begun on a large scale.

THE Sacramento *Bee* says: "Secretary of State Hendricks returned from Folsom, and reports that the work on the canal and dam near the prison is proceeding rapidly. About 200 convicts are employed on the work, and the work is so far progressed that the next step will be to divert the steam for the purpose of making way for the great dam. The advantages of the vast power to be derived from the dam are duly appreciated, for applications have already been made for double the power that will be available, notwithstanding that the dam will not be ready for some ten months yet."

C. B. TRESCOTT, agent of S. Schmidt of New York, has been investigating the sturgeon fisheries of the Columbia river for some time, and his employer is expected in Portland in a few days to make arrangements for going into the business of catching sturgeon and shipping to New York on a large scale. There is a large amount of this fish used East smoked, and the supply of fish in the Eastern rivers and lakes has been exhausted. Two varieties of sturgeon are found in the Columbia in large quantities, and if a ready sale can be found these fish will be a great source of revenue to Oregon fishermen.

THE first advices have been received from the whaling fleet, and are very discouraging. From letters received on the steamer *Dora*, which arrived from Unalak, it is ascertained that the western shore of Behring sea is almost impassable, so thick is the ice, and that the vessels are unable to get into the Arctic. The vessels usually get into the ocean about the 1st of July, but there were no indications from the latest accounts of making the Arctic for at least a month, or probably not for six weeks later. The catch, as far as reported up to the 15th of June, is but five whales, of which the *Belvidere* obtained two and the *Fleetwing*, Annie Hicks and William Bayless one each.

A NEW cannery has been started in Shasta county, and is now at work canning peaches by the Wheeler process. The Redding *Free Press* says: The present work is only an experiment, and preparatory to working things on a much larger scale next year, and putting in a plant which will put up ten tons of fruit per day. The Oliver orchard alone is estimated in peaches alone at 5000 cans, besides the fruits, which cannot be well estimated. The girls get \$1 per day, but the wages of the others have not been definitely settled. F. H. Deakin is firmly convinced that next year a cannery on a large scale will not only be a paying institution, but a great benefit to the neighborhood in giving employment both to young and old.

THE following are the dimensions of the new pilot boat *America*, which was launched recently from Matthew Turner's shipyard at Benicia: Length, 91 feet; beam, 24 feet; depth of hold, 10 feet; tonnage, 70. The spar dimensions are: Bowsprit, 10 feet; jibboom, 18 feet; foremast, 78 feet, and topmast, 16 feet; mainmast, 79 feet, and the topmast 19 $\frac{1}{2}$ feet; foreboom, 26 feet; gaff, 22 feet; mainboom, 56 feet; gaff, 22 feet. As the masts are single sticks, the total is 94 feet and 98 feet respectively. The boat will cost, when completed, fully \$20,000. She is owned by the pilots of this port, each one taking a twentieth interest in her. The *America* is five feet longer than the *Lady Mine* and has two feet more beam.

A Drying Frame.

Geo. F. Mills of 308 California St., this city, has invented a new form of frame for drying-houses for drying fruits, vegetables and other substances from which it is desirable to expel the moisture. The frames are made to be quickly attachable or detachable, so they may easily be packed in a small space for compact storage or transportation. They are easily set up again. The frames are strong and light, yet so made that they will not sag in the middle. The detachable tray-frames are ribbed or secured on the inside, and on this ribbet is supported the ends of the cross-bars of the tray sections. These cross-bars are also ribbed on one side and have times or stiff wire rods extending through them like a rake. In arranging the tray sections the ends of the cross-bars rest on the ribbets of the side bars. The cross-bars of the tray sections are made wide enough to form a base on which the sections will stand, with the times projecting upwardly, upon which tobacco leaves or other material to be dried are conveniently spitted or hung and the loaded tray section is then turned to a horizontal position and placed in the frame. This affords a very convenient mode of loading the tray sections, and the independent character of the tray-frames from the skeleton-frame permits the frame to be loaded outside of the dry-house and then to be carried in, avoiding the inconvenience and heat met with in loading trays in the dry-house. Shaft, windlog-drum ropes and pulleys are used to wind up the skeleton-frame to its position, where the tray and frame are maintained by supporting keys. The sling is then lowered for another skeleton-frame and tray. In discharging the arrangement is such that the tray is practically suspended on pivots or trunnions, and may be readily tilted to discharge its contents into a receiver below, thus saving labor. These drying-house frames are designed to be built of large or small size to suit the requirements of farm or ranch, and are adapted to dry different products at the same time.

MR. JOHN L. DOYLE, our traveling correspondent, is now visiting Eastern Oregon en route for Idaho and Montana in the interests of this journal. We trust his visit will be of much benefit to the places visited, and that he will receive valuable aid from the patrons of our publication and other friends of the cause of education and the progress of our whole coast.

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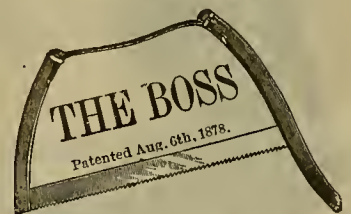
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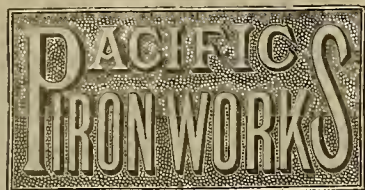
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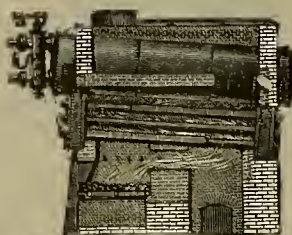
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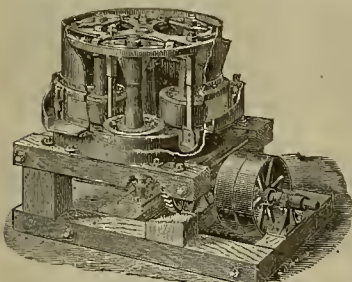
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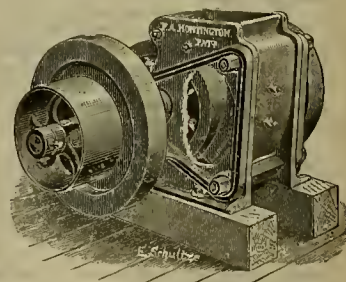
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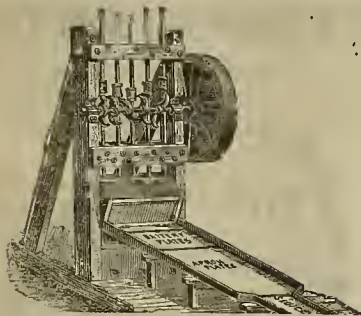
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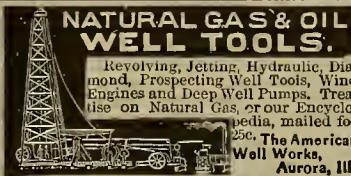
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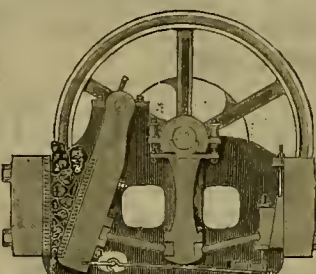
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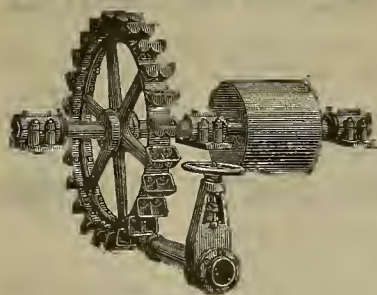


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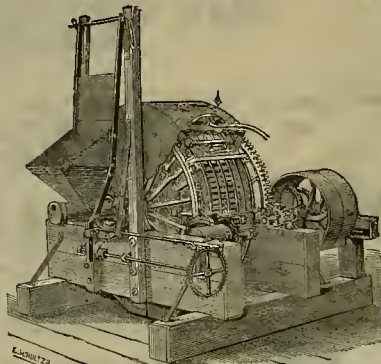
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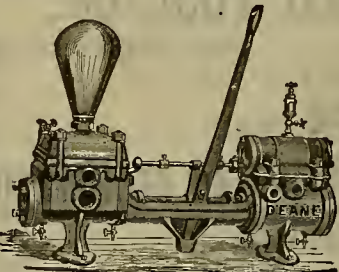
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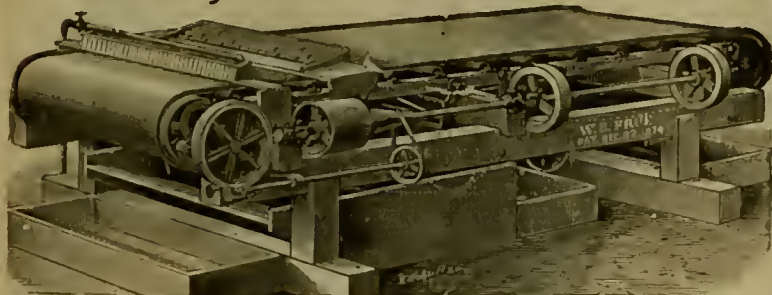
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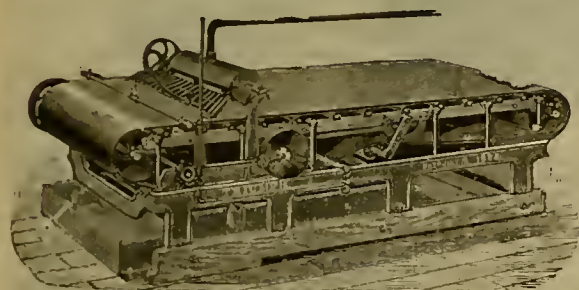
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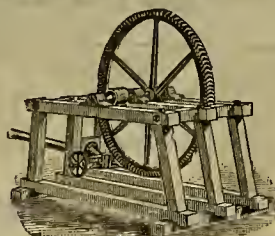
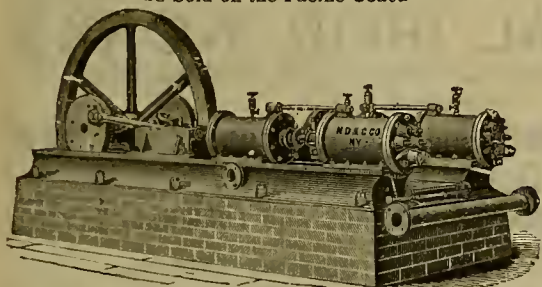
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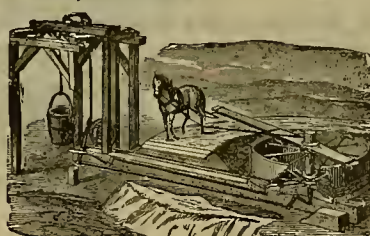
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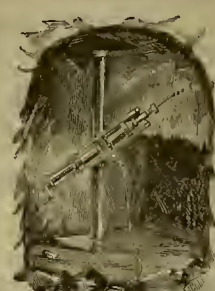


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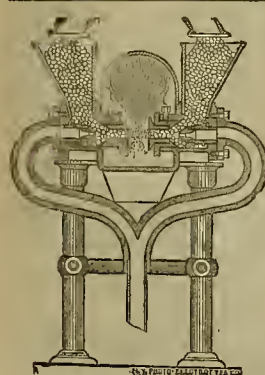
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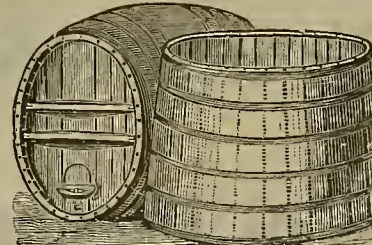
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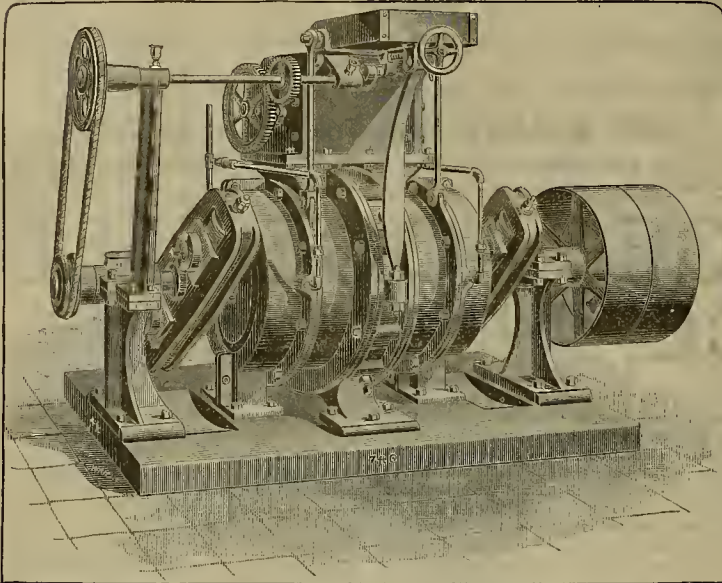
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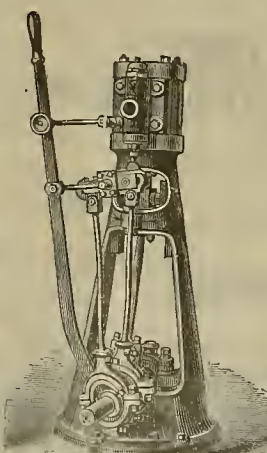
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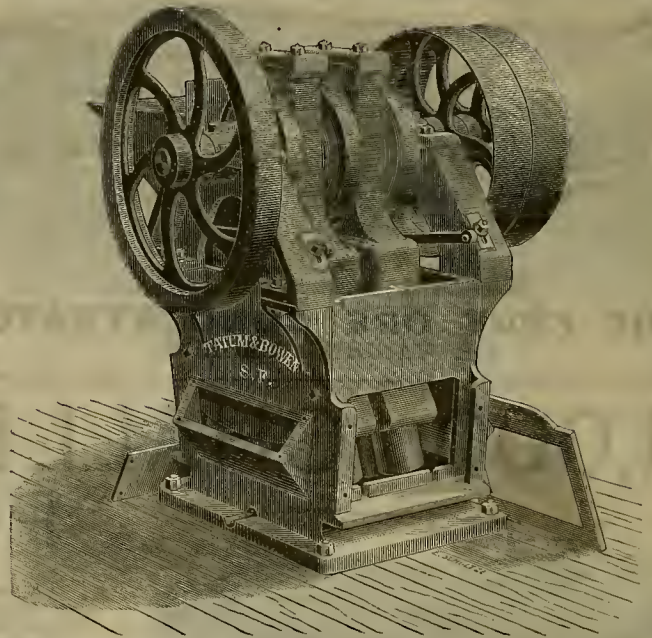
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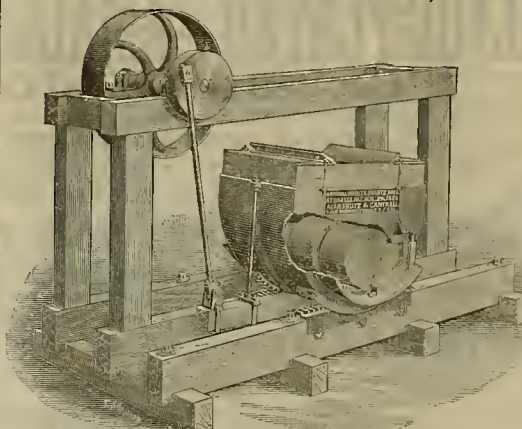
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NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

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4. The power to drive it is less than one-half of stamps.
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7. In point of amalgamation it is superior to any other machine in use.
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SAN FRANCISCO, SATURDAY, AUGUST 11, 1888.

VOLUME LVI.
Number 6.

The Westinghouse Compound Engine.

We give on this page engravings of the new Westinghouse compound engine, built by the Westinghouse Machine Co. It is really a modification of its prototype, the well-known Westinghouse "automatic" engine. The new form, by the same designer, either condensing or non-condensing, is proving itself a most economical motor. In fact, the manufacturers claim, it will develop fully the horse-power indicated upon the piston; and, still more important, will deliver a net effective horse-power to the belt upon the smallest consumption of measured water (steam) yet attained. The result is obtained, moreover, by a great mechanical simplicity. Repeated tests enable the makers to guarantee from 22 to 24 pounds of water per indicated horse-power, non-condensing, and 17 to 19 pounds condensing, the variation being according to size of engine, amount and continuity of load and steam-pressure carried.

This is a high-speed compound engine. A specific description of this compound engine is scarcely necessary, since the public, already familiar with the Westinghouse automatic engine, will understand the readiness with which this type of engine lends itself to compounding.

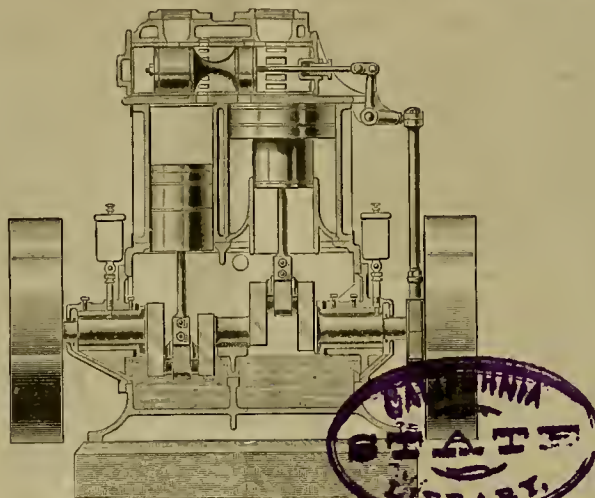
The form and characteristics of the automatic engine are retained in every particular. One cylinder is enlarged to practically $3\frac{1}{2}$ times the area of the other. A single valve works in the chamfered cylinder-head and is controlled by a shaft governor of the usual type. The clearance of the low pressure cylinder, which is the only one affecting economy, is by this construction kept at a minimum. A way is cored in the valve-chest in which is a by-pass valve used in starting the engine. The reliable piston valve is retained, nothing being more satisfactory in the essentials of balance, fit and wear. It should be particularly noted that the entire valve functions of admission, variable cut-off, compressor and release in both cylinders, are performed perfectly with the simplest known mechanism, namely, a single valve actuated positively from a single eccentric. The equivalent of this in the previous types of automatic compound engines is from four to eight valves, with one or more eccentrics and rods, and a formidable train of releasing or other valve gear. All transmitting parts are single acting and revolve in the oil contained in the crank-case, as in the "automatic" engine. The governor is continuously self-lubricating in an enclosed case of its own. A compensating rod is provided for the low-pressure piston when condensing, although the single-acting effect is substantially preserved by the action of the cushion in the annular air chamber. Both pistons are double-walled, and condensation is a minimum at all points. Spring relief valves take care of any water which may reach the cylinder. The rods and crank-shafts are all of hammered steel. Access is had to the crank-case in a few seconds in all but the smaller sizes, by the very neat device of slacking off the hand-wheel which binds the yoke, and swinging the latter around through a half-turn, carrying with it the two circular bonnets. From 100 H. P. and upward, a railed grating, reached by steps, is provided for convenient access to the throttle valve. The engine is strictly self-contained, requiring no outboard bearings. The exact interchangeability of parts, which has been so successful in the "automatic" engine is

carried out in every size of the compound engine.

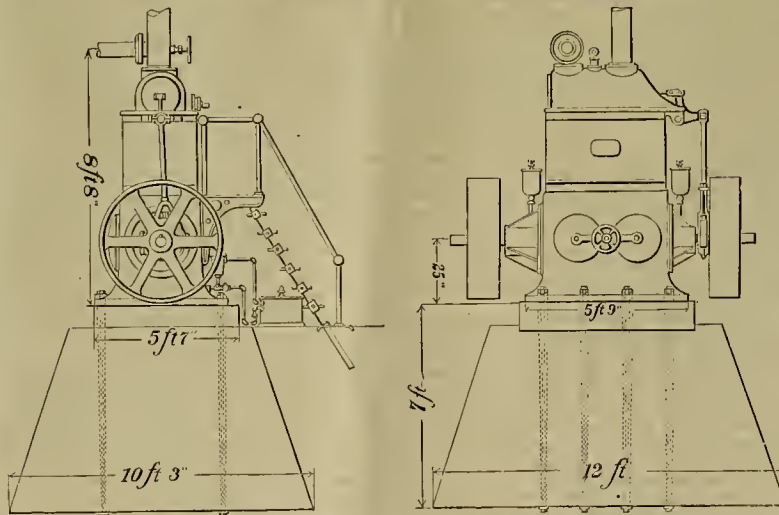
These engines may be run at any practicable speed. It is manifestly impossible to assign a rating to a compound engine, for the reason that the steam pressures employed will vary much more widely than in ordinary practice. Compounding, while relatively advantageous at

The makers built an engine that they expected would be of about 100-horse power. This was subjected to a long series of tests very carefully made. This engine proved to be of 150-horse power at 100 pounds steam pressure, and to have a very wide margin. During the tests it was worked up to 200-horse power.

The following table gives a few of the tests



SECTION OF WESTINGHOUSE COMPOUND ENGINE.



WESTINGHOUSE 14" x 24" x 14" COMPOUND ENGINE.

ordinary pressures, implies its greatest possibilities in steam pressures of 100 pounds and upward. It is certain that compound engines will be followed by types of boilers admitting of pressures of 125 to 150 pounds.

Recently the company took an order from the Knoxville, Tenn., Thompson-Heuston Electric Light Co., on a guarantee of 25 pounds, none of the representatives of 13 of the prominent engine-builders' bidding being able to do this. The Corlies engines in every-day practice are none of them going better than 26 pounds, and usually their performance is 28 pounds. An order has been taken also in New York for three engines on a guarantee of 19 pounds condensing or 24 pounds non-condensing. The general tendency in the East is all toward high steam pressure, greater fuel economy being obtained.

of this 14x24x14 compound engine, in water rates per brake horse-power, at varying pressures and loads, unjacketed and unconnected by calorimeter.

Brake Horse Power	CONDENSING. BOILER PRESSURE.			
	120	100	80	60
200	19.62	22.53	23.17	23.17
160	18.86	20.02	21.32	21.32
130	18.38	19.56	20.84	20.84
100	19.14	19.41	20.34	20.34
70	19.8	20.05	21.43	22.57
40	22.9	23.12	24.75	25.25
NON-CONDENSING.				
200	23.94	25.2	27.7	27.7
160	25.5	26.2	28.8	28.8
130	24.32	26.24	27.7	27.7
100	25.57	27.75	29.8	29.8
90	26.51	28.3	29.8	31.7
70	29.4	30.77	32.48	36.0
40	40.65	39.3	42.75	45.82

The company has placed this engine with the

Alleghany County Electric Light Co., and it is their intention to run it under a steam pressure of 140 pounds, under which they hope to get 300-horse power; this, for an engine built for 100 horse power and developing 300, is pretty good.

The tests showed 200-horse power being developed on 120 pounds of steam, consuming 23.94 pounds of water, in the shape of dry steam, per hour. With an evaporation based on that of anthracite coal of nine pounds of water to one pound of coal, this gives a result of 2.66 pounds of coal to the horse-power per hour. Parke & Lacy are the Pacific Coast agents for these engines.

The Gold-Fields of Victoria.

We received by the last steamer from Australia the reports of the mining registrars of Victoria for the quarter ending in March. The yield of gold for the quarter was 156,817 ounces. The dividends paid by mining companies amounted to £111,149; this is exclusive of dividends paid by a few private companies who declined to furnish returns. The several mining districts contributed in the following proportions: Sandhurst heads the list with £34,800; Ballarat, £20,533; Castlemaine, £17,224; Gippsland, £16,290; Maryborough, £8000; Beechworth, £5706; and Ararat, £3593.

The total quantity of quartz reported to the mining registrars as having been crushed during the quarter was 181,157 tons 11 cwt., the average yield for which was 9 cwt. 12.75 gr. per ton.

The two highest average yields of gold per ton of quartz crushed were as follows: Hanson Heathcote, 12 ozs. 13 cwt. 8 gr.; Eclipse Company, Bendoe, 12 ozs. 12 cwt.

The mining population of the colony for the quarter is estimated at 25,947. In quartz, 12,616 miners were employed and 13,329 in alluvial mining. Of the total mining population 4076 were Chinese, a decrease of 100 on the previous quarter. The number of Chinese engaged in quartz mining decreased from 190 to 188.

A table is given showing the average yields of gold from certain lots of quartz taken from the various mines. One mine on Sandhurst, the Victoria, yielded quartz from a depth of 1770 to 1900 feet, which averaged 15 cwt. of gold per ton. The ledge is from one foot to six feet wide; 1590 tons of ore were crushed from the ledge between the depths given.

THE POWDER COMPANIES.—At a joint meeting of directors of the powder companies of the coast, the following were appointed to formulate a plan to "stimulate the business:" M. A. de Laveaga of the California Powder Co., J. R. Spring of the Giant Powder Co., Christopher Reiss of the Vigor Powder Co., A. Baird of the Safety Nitro Co. and Charles L. Howard of the Vulcan Powder Co.

ROBERT D. JACKSON of East Oakland has been appointed professor of mining in the University of Nevada, at Reno. Professor Jackson was graduated from the College of Mines at the University of California in 1882.

NUMEROUS prospectors are hunting ledges along Klamath river, on both sides, especially in the Siskiyou mountain foothills, near the Oregon boundary.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

Although nearly all the chloride of silver which can be dissolved by assay-office tests with the ordinary solution can be dissolved in the mill by the above method, so that, by taking a sample from the charges and washing it with water in the assay office to remove the dissolved silver, nearly all the chloride of silver can be removed, yet the method is entirely inapplicable in the mill. Another objection to the trough system is that the sulphides produced from the supernatant solutions are much reduced in value by the slimes and dirt from the ore.

The trough system was tried at Bullionville, Nev., in 1884, at Silver City, N. M., on tailings, and at Lake Valley, N. M., on roasted ore, in 1885. Although two of the above mills had been especially adapted to the method, it was abandoned for the reason above given. The sulphides produced by the trough system at Bullionville and Silver City assayed, respectively, one-third and one-eighth as much as sulphides produced afterward by the ordinary method.

In the *Engineering and Mining Journal* of Nov. 26, 1887, the statement is made that for Cusi ore the minimum amount of ordinary or stock solution required for trough lixiviation was 12 parts of solution to one of ore, which is 384 feet per ton, although the strength of the solution was 1.6 per cent. The average amount of stock solution used per ton of this ore, in the usual method of leaching, for a period of nine months and with a solution of only 0.75 per cent, was only 80 cubic feet. Hence the trough lixiviation, using a solution twice as strong, and requiring 4.8 times the volume, necessitated the use of 9.6 times as much hyposulphite per ton of ore. One of the evil results of this would be the production of a lower grade of sulphides and an excessive use of precipitant, as the amount of lead dissolved is directly proportional to the amount of hyposulphite used. By referring to the account of some Yedras experiments in the same journal of January 21st, it will be seen that the injurious effect of caustic lime was the same while using trough lixiviation as while leaching by the usual method, even though the tailings from the former were subjected to a subsequent treatment in the assay office.

The rate of decomposition of hyposulphite solutions is directly proportional to the extent of surface exposed, so that the decomposition of the solution will be greater for trough lixiviation than for the usual method.

In fact, aside from the numerous disadvantages, actual experience indicates that the sole advantage, if any, obtained by this method of lixiviation is the saving of 12 to 15 cents per ton expense of moving the ore from the cooling floor to the ore-tanks.

In brief, the objections to the method are: 1st. In the case of raw ores and tailings and of most roasted ores, the difficulty of removing the dissolved silver mechanically retained in the ore. 2d. The production from the supernatant solution of sulphides of much lower grade than those produced from material charged dry into the tanks. 3d. The difficulty experienced in first extracting the soluble salts from roasted ore (washing). 4th. The great increase in the amount of stock solution needed per ton of ore and its greater deterioration.

Returning to the general subject of charging, we have to consider the proportion between depth of charge and depth of leaching-tank. As explained further on, in the treatment of raw ores, the extra solution is made up in a separate tank, hence no allowance is made for the making up of an extra solution in charging the tanks. Consequently, in charging raw ores, the tanks may be filled level full, as a charge, five feet in depth, will certainly sink four or five inches, this space being advisable in order that any solution running upon the top of the charge shall not frequently run over. But, in charging roasted ore, sufficient space above the charge is left for the making up of the extra solution, unless it is necessary to run the leaching-tanks to their utmost capacity, in which case the leaching-tanks are charged level full and the extra solution is made up in a separate tank, as for raw ores. Generally, for roasted ores, the depth of the extra solution is about 34 to 46 per cent of the depth of the ore at the end of the first washing with water. These are the proportions for roasted ores which sink about two to four per cent during the washing.

The rate of leaching is not diminished by an increase in the depth of charge. For instance, at Cusi was one large tank into which the roasted ore was charged to the depth of nearly 6 feet, while in all the other tanks the depth of charge was only 22 to 24 inches; yet the rate of leaching was greater for the six-foot charge. Also, in the treatment of the raw Bremen tailings, the extreme fineness of which has already been mentioned, the rate of leaching for charges 50 inches in depth was the same as for only 24 inches. The cause of this is that the slight increase in average compactness of the charge, due to increase in depth, is more than balanced by the increase in "head" of

the liquid in the ore. Of course, it is understood that, in each case, the depth of the liquid above the surface of the charge is about the same.

That large and deep charges are the most economical, appears from the following facts: The time of leaching a 50-ton charge of ore is the same as for a 10-ton charge, if the depth of ore is the same, and is comparatively but little increased by an increase of two or three times in the depth. Less water per ton is required for a deep charge, as a given volume of water will dissolve more salts in passing through a 6-foot than a 2-foot charge. The same is true of the leaching solutions with regard to the dissolving of the precious metals. The result of using deeper charges is a decrease in the amount of chemicals required per ton, particularly when using the extra solution. The labor also is much decreased, the difference between 22 9-ton tanks (as at Cusi) and 6 or 7 50-ton tanks would be a decrease of about 50 per cent in the labor connected with the leaching operations. The decrease in assay-office work would be about 60 per cent. The amount of stock solution required is also much less, which, as pointed out later on, is an important item. In fact the difference in expenses, in favor of 50-ton as compared with 10-ton charges, is not less than 65 cents per ton. For dry regions this decrease in the amount of water required is an important item.

B.—The Chemicals.

a. Conditions regulating the amounts used. As shown in Table XIV, the weight per ton of ore of each chemical required varies considerably. The circumstances governing the variation are as follows:

Hyposulphite of Soda.—The amount required per ton varies.

First, according to the condition of the ore, i. e., whether raw or roasted. The weakening of the hyposulphite solution is chiefly due to its dilution with water while it is following the first wash-water through the ore, as in the treatment of roasted ore, and while the last wash-water is following the solution in the treatment of both raw and roasted ore. As no first, but only the last, wash-water is required in the treatment of raw ore, while both are necessary in the case of roasted ore, it is evident that the weakening of the solution in this way is twice as great for roasted as for raw ore. Also, raw ore requires less hyposulphite for another reason. In treating roasted ore, the extra solution, being always preceded by the first wash-water and nearly always by the stock solution, must necessarily be used on ore containing a liquid different from itself, with which it is diluted and weakened in passing through the ore. In making it up for roasted ore an additional amount of hyposulphite must, therefore, be used. But in treating raw ore or tailings, the extra solution is nearly always used first, and therefore on material which is perfectly dry, and no allowance has to be made for dilution.

Secondly, directly as the volume of stock solution. The hyposulphite of soda is added to the solution at the rate of a certain number of pounds per ton of ore. As the principal object is to maintain the strength of the stock solution at a certain percentage, say, 1.5 per cent, and yet use the least possible quantity of hyposulphite per ton of ore, it is evident that the smaller the volume of stock solution the less hyposulphite will be required. For instance, if, in works treating 100 tons per day, the amount of stock solution were 3000 cubic feet, the amount of hyposulphite required to raise the strength of that solution by any given percentage would be twice as great as that required for a stock solution of only 1500 cubic feet. Therefore, the amount of stock solution should be as small as possible.

Thirdly, directly as the strength to be maintained. Evidently, the amount of hyposulphite per ton of ore required to maintain a certain strength of solution, will depend upon what that strength is to be. For instance, each pound of hyposulphite will decompose to about the same extent, whether it is in a strong or weak solution. Therefore, in a given time twice as many pounds will decompose in a two per cent as in a one per cent solution.

Fourthly, inversely as the richness of the ore in metallic compounds dissolved by the solution. In the dissolving of the metals of the ore by the leaching solutions, little or no hyposulphite is lost or destroyed, as the S_2O_3 of the sodium hyposulphite attaches itself to these metals only temporarily, and again returns to combination with sodium as sodium hyposulphite, when the metals are precipitated with sodium sulphide. Also, in the manufacture of sodium sulphide, hyposulphite of soda is formed as a by-product, which enters the leaching solution when the sodium sulphide is used as a precipitant. As the amount of sodium sulphide used in precipitating a given volume of solution, and consequently the amount of hyposulphite entering that volume, varies as the metal contained in it, and as the ordinary solution, in passing through a charge, seldom or never dissolves such an amount of metal as to become saturated, but approaches nearer to that point in proportion to the richness of the ore in silver, copper and (to a certain extent) lead compounds soluble in the solution, the increase in strength of that volume of solution will depend upon the richness of the ore. If only a weak solution is to be maintained, this addition to the strength of the hyposulphite solution may be sufficient to make up for the weakening from all causes.

Fifthly, inversely as the capacity of the

works. Although the strength of the solution makes a difference in the volume of solution required to leach a ton of ore, it makes little difference in the amount of stock solution required for works of a given capacity. It is found in practice that, with ore tanks and precipitating tanks of the proper dimensions, the volume of stock solution required is less in proportion for works of 100 tons per day than for those of 50 or 25 tons. Therefore, it is evident that more hyposulphite per ton of ore will be required to keep up a given strength in works of small than in those of large capacity.

Sixthly, according to the order in which the charges are treated. The volume of stock solution, and consequently the amount of hyposulphite required to maintain its strength, depends upon whether the charges are treated in rotation and with regularity, or so irregularly that the number of charges requiring solution varies considerably at different times. Regularity in the treatment of charges is of importance for other reasons also.

Seventhly, with roasted ore, as the ore is acid or alkaline. The difference in weight of chemicals required by acid and alkaline ores is very marked. Below is given the amount of hypo used in each case per ton of ore:

ACID ORES.	
Ontario.....	5 lbs. Hypo
San Antonio.....	7 " "
Sombrerete.....	5.3 " "
San Bartolo.....	3.0 " "
Average.....	5.06 lbs.
SIMPLE ALKALINE AND ARSENICAL ALKALINE ORES.	
Veta Grande.....	4.0 lbs. Hypo
Sierra Grande.....	2.6 " "
San Miguel.....	3.7 " "
Daly.....	1.5 " "
Average.....	2.9 lbs.

The difference is due principally to the fact that both extra and ordinary solutions may be used much weaker for simple alkaline than for acid-roasted ores.

2.—*Bluestone.*—The amount of bluestone used per ton of ore depends

First, upon the condition of the ore, i. e., raw or roasted. As shown in Table XIV, the average amount of bluestone for raw ores is 2.53 lbs., and for roasted ores 5.6 lbs. per ton.

Secondly, in the case of roasted ores, upon the acid or alkaline character of the ores. For the four acid ores, Ontario, San Antonio, Sombrerete and San Bartolo, the amount of bluestone per ton is 6.8 lbs. On the other hand, for the four alkaline ores, Lake Valley, San Miguel, Veta Grande and Daly, the average is only 4.4 lbs. per ton of ore.

Thirdly, upon the method of using the extra solution. If the extra is preceded by the special extra solution, the amount of bluestone required per ton is considerably diminished.

3.—*Caustic Soda and Sulphur.*—The weight of sulphur used in making sodium sulphide is always two-thirds of the weight of caustic soda. The weight of caustic soda, and, therefore, of sulphur, depends

First, upon the richness of the ore in metallic compounds soluble in solution, but not soluble in water. It is evident that the amount of precipitant required per ton will, other things being equal, vary as the amount of silver to be precipitated or directly as the value of the ore in silver. Of the forms of copper occurring naturally, only one, so far as known, namely, carbonate of copper, is soluble in solution, and at the same time insoluble in water. As it is not likely to occur in roasted ore, it is only of importance in this connection when it occurs in an ore treated raw. Dichloride of copper occurs to a small extent in chloridized ores and is soluble in the hyposulphite solution, but practically insoluble in water. Sulphate of lead occurs in roasted ore and sometimes in raw ores, and is slightly soluble in hyposulphite solution. The amount in excess of 0.5 per cent present in the ore is immaterial, as only a few pounds, in any event, would be dissolved during the leaching.

Secondly, upon the amount of bluestone used and the mode of using it. Evidently any unnecessary increase in the amount of bluestone used per ton should be avoided; for, with the exception of that part of the copper taking the place of the silver dissolved by the cuprous hyposulphite, and the small part expended in counteracting the effect of caustic soda or lime, the copper is precipitated by the sodium sulphide, increasing the consumption of the precipitant and lowering the grade of the sulphides. As the amount of bluestone used per ton of ore varies as the ore is raw or roasted, and (with roasted ore) as it is acid or alkaline, the amount of caustic soda is, indirectly, dependent upon the same conditions, the amount used being less for raw than for roasted ores, and less for alkaline than for acid ores.

4.—*Soda Ash.*—The amount of soda ash needed per ton of ore depends

First, upon the presence or absence of sulphate of lead. The amount of sulphate of lead in an ore (when over 0.5 per cent) makes, for reasons already mentioned, but little difference in the consumption of soda ash.

Secondly, upon the amount of sulphate of lime in stock solution. If the stock solution is saturated with sulphate of lime, its dissolving power for sulphate of lead is decreased, approximately, one-half. The presence of such a percentage of sulphate of lime would, however, prevent the economical use of soda ash for the precipitating of the remaining half, and is undesirable in other ways. In treating lime ores, soda ash is not generally used.

Thirdly, upon the temperature of the solution. The amount of soda ash required varies as the temperature of the solution, since lead

sulphate is more soluble in hot than in cold solutions.

5.—*Sulphuric Acid.*—Acid is used for two purposes, the acidifying of the first wash-water for roasted ores, and the neutralization of caustic impurities in the solutions. Its use is confined almost entirely to the treatment of roasted ores. The weight of acid used per ton depends:

First, upon the state of the ore, i. e., raw or roasted. As raw ores have no first wash-water to be precipitated, and no caustic alkali is present in raw ores, it can enter the solution only by means of the sodium sulphide. This amount is so small that it is generally neutralized by the extra solution, so that, when extra solution is used, no acid is required in the treatment of raw ore.

Secondly, upon the acidity or alkalinity of the first wash-water. In treating roasted ores, the silver is usually precipitated from the first wash-water by means of acid and old iron. The amount of acid required per ton varies according to the condition of the first wash-water. If it be alkaline, more acid must be used than if it were neutral or acid. The state of the first wash-water varies with the nature of the ore. Very base ores often produce such an acid wash-water that no further addition of acid is necessary. But "fres" ores usually produce a neutral or alkaline wash-water. Often, even when the wash-water is quite alkaline, the amount of silver dissolved from the ore by it will be more than one-fourth of the silver in the ore, and sometimes (as at the Sierra Grande) mere dilution with water will fail to precipitate it, nor will precipitation take place on organic substances within a reasonable time, nor on iron or copper until the addition of sufficient acid.

Thirdly, upon the amount of silver extracted by the first wash-water. Often, as at the Ontario with a Staatsfeldt furnace in 1883, and at Sombrerete with a reverberatory furnace, the amount of silver dissolved by the first wash-water is so small that it is not precipitated, so that no acid is required.

In other cases, as at the Sierra Grande, the amount may be 30 per cent of the value of the ore, and two pounds of acid may be required.

Fourthly, upon the presence or absence of caustic lime in the ore. The presence of caustic lime in the roasted ore usually doubles the amount of acid required for precipitating the wash-water, making it two pounds for such ores, as against one pound for ores producing a neutral wash-water.

Fifthly, upon the mode of using the extra solution. Hydrate of copper is practically insoluble in the ordinary solution, so that the extra solution acts as well as an acid as far as the neutralization of caustic alkali is concerned. But as the bluestone is usually added to only a small portion of the ordinary solution, its effects are confined to that portion. So, in the case of alkaline roasted ore, where the amount of caustic alkali is always greater than for raw ores, it might seem that the bluestone used would not be sufficient to neutralize all the caustic alkali, and that the use of acid might become necessary to the extent of one-half to one pound per ton. This, of course, would be the case in the treatment of roasted ore containing caustic lime if it were not for the fact that the extra solution is usually employed on such ores in such a way as to counteract entirely the effect of the caustic alkali. If the ordinary solution is used first, before the extra, the caustic alkali acts injuriously upon the silver compounds dissolved by it. For this reason, the extra solution is used first, and in such a volume that, although weak, it protects the silver from the action of the caustic alkali.

Sixthly, upon the mode of precipitating the first wash-water. Of course, the amount of acid used will depend upon the mode of precipitating the first wash-water, whether by that method just described or by dilution or by sodium sulphide.

(To be Continued.)

WHERE THE SPECIMENS CAME FROM.—The Julian (San Diego county) *Sentinel* says: The San Diego papers continue to waste their valuable space in trying to make people believe that Lower California is a rich mining country. They have been at it now for over six months, but the longer they "whoop up" the rich (?) strikes in Lower California the worse the public gets disgusted with them. As yet no gold-quartz specimens really coming from Lower California have been exhibited in San Diego, although a well-known real estate firm there keeps stacks of beautiful rock on exhibition in its office. Where does it come from? The answer is simple. Some time since a gentleman living at present in Julian, went to San Diego, taking with him a beautiful specimen of quartz from the Gold King mine. He was showing it to some of his friends on the corner of Sixth and F streets, when it very mysteriously disappeared. The next place he saw it was in a show-case in said real estate office, labeled "From Lower California." So it is with all the specimens that are sent to San Diego from Julian. They are hoaxed and exhibited as "Lower California minerals." We will admit that some very little inferior gold has been found in Lower California, but there is not water enough in the country to work it. We would advise our San Diego contemporaries that when they want to write up another boom article they do so at home—don't go to Mexico. Send out a good reliable man and let him stay a week or ten days in the Julian district.

The Lucky Prospector.

The Ups and Downs of a Prospector's Life.

About the happiest mortal this side of Kingdom Come, says the *Nevada Herald*, is the man who has just struck it rich. After months and years of weary toil, of despairing hopes and continued disappointment, to suddenly strike rich ore will come as near setting a man wild as it is possible for good luck to do it. It is true, even rich strikes do not always prove lasting, and many times the wildest visions are dissipated by future developments. But while the fever is on there is no disease under the sun like it.

When Mark Twain and Higby struck that "blind lead" which held its independent way through the "Wide West" vein, cutting it diagonally, and knew it was separate property, and they could locate it, any prospector knows just how they felt, but no one can express the feeling as well as Mark Twain. Any one can imagine Twain's feelings when Higby exclaimed in a stage whisper, after coming out of the shaft: "I knew it! We are rich! It's a blind lead!" And after the notice had been put up and duly spread upon the Recorder's books, and the two had gone to their bed at midnight, who cannot readily understand why sleep refused to visit their eyelids? It is easy for any one who has prospected and thought he had struck it rich to realize how they could do nothing but lie awake and think, and dream and scheme. How the floorless cabin would turn into a palace, the ragged gray blankets into silk, the rickety furniture into mahogany! One can see how natural it was for Higby to ask of Mark when he was going home to the States and how he answered next month. How they discussed what city they would settle in, and what kind of a mansion they would build. How they talked of a trip to Europe, and how long they would remain over there, and how they figured on spending at least \$40,000 or \$50,000 so as to make it a swell trip. How, finding sleep impossible, they arose and played cribbage and smoked till sunrise, and then discovering that nature required food, even after one has struck it rich, they had to go to work and cook their own breakfast and fry their own flapjacks. One can readily understand how the news flew around the camp, and how people rushed in to see for themselves; how, when offered \$200,000 each for their share, they squandered everything short of \$1,000,000 cash down. These experiences are quite common to the prospector, though perhaps on a smaller scale. And most prospectors have in the end had an outcome very similar to that of Twain and Higby with their "blind lead." Twain went off to see a sick friend the next day, leaving a note for Higby to not fail and do the ten days' work necessary to hold the lead. Higby happened not to go to the cabin till the day Twain returned, when both found that the time had expired and the "blind lead" had been jumped. Then they sat down sick, grieved and broken-hearted. While a minute before they had been rich, now they were paupers—in debt even to their butcher. Every prospector can closely follow the course of their thoughts during the period of months that followed. It is the same old story with them all. At the top round of the ladder one day, at the bottom round next. Rich as Croesus one minute, poor as Lazarus the next. That is the life of the genuine prospector. As some tickets draw prizes in lotteries, so some prospectors hit it genuinely rich. And as a great majority of lottery tickets are blanks, so a majority of prospectors discover their finds worthless. As a rule the old fellows breathe their last in a charitable institution, or alone and neglected, in their lonely cabins. They are a race of beings separate and distinct from the balance of the human family, as much as the aborigines are distinct from the civilized races. They are the most generous, the most improvident and generally the poorest men in existence. Yet the gold and other precious metals that have enriched the world would doubtless still lie hidden in the bowels of the earth had it not been for the prospector. He has withstood the cold of winter, and the heat of summer, to uncover mines of wealth for others. He has deprived himself of the comforts of life that the world might have gold and silver, and when death comes it generally finds him asking for enough to appease the pangs of hunger, but it is given to him sparingly. Soldiers are pensioned for their services to the country, and so should the genuine prospector become the ward of a beneficent government. When such pioneers are placed under the sod, a monument should be erected over their remains, with the inscription: "Here lies a man who devoted his life for the benefit of others; who made the world rich, but who lived in squalor and rage and died in wretchedness at the end."

JOSEPH D. REDDING, United States Fish Commissioner for this coast, states that from all indications he has every reason to believe that the lobsters recently transplanted here are thriving. On being placed in the bay they took naturally to their new surroundings and made themselves at home. No dead ones have been seen since, and this is conclusive proof that they are doing well on the rocky bottom of their new home.

LEWIS LELAND of the Leland hotel at Chicago contemplates building a large hotel at the City of Mexico for the accommodation of tourists.

Two Shafts on Mines.

We gave in the *PRESS* two weeks since a letter from E. W. Roberts of Grass Valley, calling our attention to a law now in force, requiring two shafts on mines in this State. The law was approved March 16, 1872, and is as follows:

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall not be lawful for any corporation, association, owner or owners of any quartz-mining claims within the State of California, where such corporation, association, owner or owners employ twelve men daily, to sink down into such mine or mines any perpendicular shaft or incline beyond a depth from the surface of three hundred feet without providing a second mode of egress from such mine, by shaft or tunnel, to connect with the main shaft at a depth of not less than one hundred feet from the surface.

SEC. 2. It shall be the duty of each corporation, association, owner or owners of any quartz mine or mines in this State, where it becomes necessary to work such mines beyond the depth of three hundred feet, and where the number of men employed therein daily shall be twelve or more, to proceed to sink another shaft or construct a tunnel so as to connect with the main working shaft of such mine as a mode of escape from underground accident or otherwise. And all corporations, associations, owner or owners of mines as aforesaid, working at a greater depth than three hundred feet, not having any other mode of egress than from the main shaft, shall proceed as herein provided.

SEC. 3. When any corporation, association, owner or owners of any quartz mine in this State shall fail to provide for the proper egress as herein contemplated, and where any accident shall occur, or any miner working therein shall be hurt or injured, and from such injury might have escaped if the second mode of egress had existed, such corporation, association, owner or owners of the mine where the injuries shall have occurred, shall be liable to the person injured in all damages that may accrue by reason thereof; and an action at law in a court of competent jurisdiction may be maintained against the owner or owners of such mine, which owners shall be jointly or severally liable for such damages. And where death shall ensue from injuries received from any negligence on the part of the owners thereof by reason of their failure to comply with any of the provisions of this Act, the heirs or relatives surviving the deceased may commence an action for the recovery of such damages as provided by an Act entitled An Act requiring compensation for causing death by wrongful act, neglect or default, approved April twenty-sixth, eighteen hundred and sixty-two.

SEC. 4. This Act shall take effect and be in force six months from and after its passage.

Petroleum in San Luis Obispo County.

As we noted at the time, Mr. Ezra Carpenter some weeks since determined to sink a well for oil at a point a short distance from the quarries of the Bituminous Rock Company. A contract was entered into with parties having an outfit for the purpose, to go down 1000 feet as a matter of experiment, and the work was commenced and has since been pushed industriously. We learn from Mr. Carpenter that the first 31 feet was bored through soil, when water was reached and a formation of soft sandstone. Going through this for 51 feet, a stratum of hard sandstone was met nine feet in thickness. Passing that, sandstone was again encountered and faint indications of oil, which have grown stronger until now, at a depth of 180 feet, the oil is present in very perceptible quantity. Mr. Carpenter Wednesday brought in a can of the sand, oil and water fetched up by the drill, in which the presence of petroleum is unmistakable. So the work proceeds with good heart and firm hopes of fortunate results.

Judge Beebe, in speaking of the matter, referred to the past and to former hunts for oil, the earliest being about 1865, when the oil excitement was at its height in the East, and the celebrated Professor Silliman chanced to be on a visit to this county. As a result of the professor's favorable opinion of the chances for striking oil in this vicinity, wells were started, one near Mills' Station and one near the Tar Springs, on the Huasna road, but were abandoned in discouragement after sinking about 400 feet. No such favorable indications were found in either well as the Carpenter well now shows. Prof. Silliman was of the opinion that beyond the shadow of a doubt there were very great deposits of oil in this vicinity. The great masses of sandstone, heavily saturated, not with bitumen or asphalt, or like products, but with petroleum, proves it beyond question. It only remains for some enterprising capitalist to explore to a sufficient depth and to the right place to tap the hidden wealth, and in so doing to vastly increase his own riches and open up a great era of progress and prosperity for the county.—*Tribune*.

A COMPANY of English capitalists have organized to turn the Feather, two miles above Oroville, and to work an extensive gold bed. It is estimated that \$100,000 will be required for the work.

Monster Pumps.

The Spring Valley Water Co.'s New Works.

The new pumping works of the Spring Valley Water Co. near Belmont, says the *San Mateo Times and Gazette*, are about completed. Few people have any conception of the magnitude of these works, nor even, when the purpose is known for which the pumping station has been built, will it seem possible that so much machinery and such an outlay of money has been necessary to overcome that which, to the unfamiliar mind, seems but a trifling obstacle.

It is well known that the immense water-pipe which is now being laid through this county and across the bay at Ravenswood to carry water from Niles canyon, Alameda county, to San Francisco, has not sufficient fall to conduct the water through to its destination, and to furnish this required force the pumping works now in course of construction at Belmont were designed.

Before a detailed description is given of the buildings and machinery to be used, the writer will explain the means by which the water is thoroughly purified and finally given sufficient headway to carry it on to the city. The large main turns from the county road opposite the pumping works, and the water will be conducted in a 30-inch pipe through a series of concrete wells or cisterns where it will undergo a purifying process. In the first cistern the sand is removed; in the second the water passes through 40 screens, which are intended to remove all other impurities it may contain. It will then be conducted to a large receiving well which connects with two other wells, from which pipes lead to the two large pumps inside the building. These pumps force the water through a 30-inch pipe up the adjoining side hill, a height of 192 feet, into what is called a stand-pipe, 80 feet high. This pipe is made of wrought iron and is six feet wide at the base and three feet at the top. It is a sort of receiving well or tank designed to give more fall to the water. A 36-inch pipe laid parallel with the ascending pipe will conduct the water down the hill to the main, and with the force thus gained the water will be conducted to the company's reservoir on University mound, from where it will be distributed throughout the city.

The building, which is of solid framework covered with corrugated iron, is divided into two departments, an engine and a boiler room. The engine-room, which is 75x62 feet, is a perfect maze of machinery. The floor is of solid concrete to a great depth. Here stand two immense Corliss compound (high and low pressure) engines and pumps placed tandem, each with a capacity of over 4,000,000 gallons per day. Each of these engines is driven by a fly-wheel 16 feet in diameter and weighing 16 tons. The plungers of the pumps are 12½ inches in diameter and have a stroke of 42 inches. From each pump is a 20-inch cast-iron pipe, both of which join and connect with the 30-inch pipe in which the water is forced up the hillside. The air chambers on the pumps are 20 feet high.

In the boiler-room, which is 36x100 feet, located in the southern wing of the building, stand four vertical Hazleton boilers, two of which will burn coal and two petroleum, which will be procured in Santa Cruz county. Each boiler stands 27 feet high and has a 30-foot smokestack. It is calculated that the boilers will consume 10 tons of coal and 50 barrels of petroleum every 24 hours. The engines are from the Union Iron Works and the boilers were built at the Pacific Iron Works, San Francisco, and are of 200-horse power.

Alongside the building is the coal-dump, which is 90 feet long, 60 feet wide and 15 feet deep. Here also are located the large petroleum tanks, each with a capacity of 2000 gallons. A side track has been laid from the main road across the coal-dump and petroleum tanks, so that the fuel can be unloaded close to the boilers. Inside the boiler-room is a small steam pump which will be used for supplying two of the boilers with petroleum from the tanks. Another small steam pump will supply the boilers with heated water. In the engine and pumping room is a lifting crane, which is so arranged on rollers overhead that heavy pieces of machinery can be moved from one part of the building to another with ease and safety.

At the southern end of the building is a large reservoir with a capacity of 4,000,000 gallons for collecting the water while the pumps are not running. It is also connected with the pumps, and water can be taken from it should the main pipes fail at any time in their supply through accident or otherwise. Work has been pushed as fast as possible on these works since last March, and in another month everything will be ready to commence pumping. Mr. B. W. Hayes is the superintendent of the inside work, and will, when the works are completed, have charge of the station. He is an engineer of unquestioned ability, and informs us that these works are the most extensive of the kind on the coast. Fifty men have been employed regularly since the work commenced, and an additional 50 will be required before it is completed. Mr. H. W. Walker has charge of the outside work. Most of the dirt taken from the excavation has been distributed on the county road, and some has been used in filling up the tide lands on Wm. Newhall's place.

THE telegraphic facilities between Portland and San Francisco are to be enlarged.

The Copper Corner.

A Paris dispatch to the *New York Herald* says: The *Herald* correspondent called last evening on Baron Sonbeyran, who knows as much as any one about the Rio Tinto complications. "Can the Secretan copper syndicate carry the road they have undertaken? What will become of the English speculators who have been selling short? What about the general condition of the copper market?" These are some of the questions I put to the celebrated financier, and here is his reply:

"There has been much needless and extravagant talk in regard to this matter. Secretan and his associates are engaged in an enterprise in no way different from any similar ones already accomplished. The same thing has been done in cotton, wool and coffee; why not now in copper? I know the resources and abilities of those interested in the scheme, and I can give you the most unqualified assurance that they are abundantly able to bring this operation to a successful termination."

"There is nothing extraordinary about the present price of copper. It has varied between £40 and £120 for Chili bars and it is now in the neighborhood of £80, which allows a reasonable profit for the mining companies without being a burden to the consumers."

"As to the syndicate being unable to support the strain of the copper they are buying and holding, such talk is utter nonsense. They could hold that and very much more were it necessary. English speculators, of course, are interested in spreading contrary reports, but when the time comes for them to make good their contracts, we shall see who will get the worst of it. They will find themselves in a trap from which the only escape is in handing over the difference. You may be quite sure the French syndicate knows what it is doing."

"I found that Secretan was absent from Paris, but I was able to see M. J. Laveissiere, whose extensive interest in copper mines is bringing him into very close relations with Secretan."

"I have the most perfect confidence," said he, "in the ability of Secretan to carry out what he undertakes. For eight months we were sinking large sums of money in one mine, and had things gone on as they were we should soon have been obliged to abandon the work. Most of the copper companies would have been ruined, and those remaining, having full control of the market, would have succeeded in forcing prices up to the highest point. As it is, copper quotations are stationary at reasonable figures, and they remain there. If the English operators are counting on lower prices, they are doomed to disappointment. In my opinion the law of France would undoubtedly require mining companies who made contracts with Secretan to fulfill them. On the whole I see nothing remarkable about the present condition of the copper market except that it is remarkably satisfactory."

Around Mokelumne Hill.

The *Mountain Echo* says: We are informed that the residents of Mokelumne Hill are becoming encouraged with the future mining outlook for that place, and base their expectations upon the development of the numerous quartz lodes of that section that have never been tested. There is not a quartz vein in that locality that has been prospected beyond a depth of 125 feet, and we doubt if that depth has in any instance been attained. The Moser quartz mine, situated a short distance from that town, is being prospected at present, and, we understand, is making a favorable showing. Mr. Moser informs us that he has shipped a batch of assorted ore to San Francisco for reduction, which assayed a fraction over \$100 a ton. He also informs us that as depth is attained in the mine the ore increases in richness. Why there should not be ledges in that locality equally as productive as the mines of Angels and vicinity we cannot understand. The lodes of the Mokelumne Hill district are situated on the same quartz belt and the croppings are just as prominent and distributed over as much territory as the lodes in Angels. But one thing is certain, the pay ore is deeper than in Angels and the adjoining districts. This fact has been demonstrated in several instances. It is useless for an individual or a company of small means to attempt to handle that character of mining property. The introduction of men of capital into that section would soon lead to the development of the quartz lodes there, and, after a proper test, we feel satisfied that the results would be astonishingly remunerative. The ore of that section is not of a rebellious character, and, in consequence, can be reduced at less expense than ore found in many other parts of the county. We are satisfied that the time will come when the merry chorus of stamps will be heard in Mokelumne Hill, and that business of all kinds will become as active as in the primitive days of placer mining. Bring your mines to the notice of capitalists and let your inducements be reasonable and inviting.

AURORA.—Aurora is steadily improving in every respect, and the population is increasing. Capital from abroad is being brought to bear on Aurora, and it is having the effect of unearthing some of the richest prospects that have been encountered in that vicinity for years. Everybody rejoices over the new lease of life for that once thrifty camp.



A. T. DEWEY.

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SAN FRANCISCO

Saturday Morning, Aug. 11, 1888.

TABLE OF CONTENTS.

EDITORIALS.—The Westinghouse Compound Engine; The Gold Fields of Victoria, 89. Passing Events; When Hydraulic Operations May be Enjoined; "The New South"; Foundry Notes, 92. Prospecting in Alaska; Hand-Drilling, 93.

ILLUSTRATIONS.—Westinghouse Compound Engine, 89. Forms of Points for Mining Drills, 93.

MISCELLANEOUS.—The Russell Process, 90. The Lucky Prospector; Two Shafts on Mines; Petroleum in San Luis Obispo County; Monster Pumps; The Copper Corner; Around Mokelumne Hill, 91.

MECHANICAL PROGRESS.—Further Improvement in Basic Steel; Spirally Welded Steam Pipe; Does Machinery Wear Out; A Petroleum Engine; Compound Air-Power in Paris, 94.

SCIENTIFIC PROGRESS.—The Magnet; Sunspots and Temperature; The Oscillations of High Chimneys; Recording Movements Automatically; Origin and Character of Meteorites; Influence of Forests on Moisture; Strychnine for Drunkenness, 94.

GOOD HEALTH.—Breathing in Smoke; Care of a Cold; Smoking and Digestion; Height of Soldiers; How to Grow Old Gracefully, 95.

USEFUL INFORMATION.—How Celluloid is Made; Keeping Copper Plates Clean; How to Skin an Elk; Utah and Its Resources; A New Flameless Explosive; A New Solder; Blossoms Once in Fifty Years; A Bran Packer, 95.

ENGINEERING NOTES.—The Percep Canal; Eiffel's Big Tower; The Great Canals of the World; The Longest Railroad Tunnel; New and Important Use for Dynamite; The Chicago River Set on Fire, 95.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 96-97.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 100.

Business Announcements.

[NEW THIS ISSUE.]

Saw Mill Machinery—Stearns Mfg Co.
Sampling Works for Sale—Gillespie & Childs.
Anti-Incorustation Powder—J. C. Winans.

See Advertising Columns.

Passing Events.

Another revival of the Meadow Lake mining district is in progress. The mill has just completed its first run and a bar worth \$580 has been shipped. The ore assayed \$14 per ton, and they made a net profit of \$4 a ton on the lot worked. The mill will continue to run during the season.

The people of the United States feel deep regret at the death of General Sheridan, one of the great commanders of the war. His military services were highly appreciated and he was greatly respected in his private life as well.

The Mechanics' Fair opened this week. All the arrangements are not as yet complete, but in a very few days the display will all be in order. The attendance on the first evening was very large.

There is considerable complaint from the interior counties at the way the mineral lands are being appropriated and fenced in, thus restricting the area for prospecting. If matters go on as they are now doing in this regard, the miners say it will not be many years before all the mineral lands of the State will be under fence as agricultural.

The Anaconda mine, Montana, is building \$175,000 worth of new structures.

When Hydraulic Operations May Be Enjoined.

Mr. Chas. Barnard of San Buenaventura writes the PRESS inquiring if there is anything in the hydraulic-mining law prohibiting that style of mining on a stream not tributary to a navigable river. Before attempting to answer this inquiry, it may be premised that there is no statutory law regulating or in anywise relating to hydraulic mining, except such as has grown out of the rulings and findings of the courts. No bill having special reference to this subject has ever been enacted by the Legislature, State or national, though some attempts to secure the passage of such bill have at different times been made, but thus far without avail.

The objections to hydraulic mining, as developed by the judicial proceedings had against those engaged in the business, are threefold: 1st, the injury thence arising to the agricultural lands situated along the outletting channels to the mines; 2d, the shoaling caused to the navigable streams and the filling up of the harbors into which they empty; and, 3d, the damage done to the towns located on the banks of these streams, which, through their shoaling, have exposed such towns to be the more readily flooded during seasons of high water.

To determine whether in any case the decision of the courts could be successfully invoked to prohibit hydraulic operations, it is only necessary to ascertain whether or not such operations would cause serious harm in any of the several particulars above mentioned. If by these operations any private property is going to be injured or any public interest inconvenienced or much impaired, it may be expected that the courts will interfere to put a stop to them, the rule, briefly stated, being this: If any third party is materially harmed, the law runs against the hydraulic miner.

This class of miners in the northern part of the State have not been molested for the reason that their operations have resulted in injury to no one. The streams into which they discharge their tailings are not navigable, nor are they tributary to navigable waters. They debouch, not into bays or harbors, but directly into the open ocean, there being no large towns on their banks, or low-lying farming lands along them. Wherever similar conditions obtain the hydraulic miner has enjoyed a like immunity from molestation. Thus far, only in the more central mining counties of California have the miners been enjoined from working their claims by the hydraulic method. In no other section of the State, nor in fact in any other part of the world, has this style of mining been suppressed by legal process or even made the subject of much complaint; and that, presumably, because the objections to it have in no other locality applied with such force as in these central mining counties.

As regards the supposed case put by our correspondent, his statements are not explicit enough to warrant us in giving an opinion upon it one way or the other. This, however, may be said: Should all the parties living or owning property along a stream consent to the hydraulic miner running his debris into the same, this would not prevent his being enjoined by other parties, should his operations cause them damage.

In closing these remarks it may be observed that the courts, in considering these anti-debris cases, have of late shown a disposition to increase rather than relax the rigor of their former decisions, the opponents of the hydraulic miners, encouraged by this attitude of the courts, having all the while grown more and more exacting in their demands. Their exposure to this double fire admonishes those engaged, or about to engage, in hydraulic mining to proceed with caution, many able jurists holding the opinion that some of the decisions made in the adjudication of these cases have a very wide latitude. The court being in this instance a law unto itself, it cannot be foreseen what further in the way of original legislation may come of such little restricted judicial discretion!

GUSTAV REIS, an early pioneer of this State, died in this city Sunday night. He was formerly a resident of Downville, and at one time was one of the owners of the Sierra Buttes mine, Sierra City. Mr. Reis was president of the California Pioneers in 1886-7. He left a fortune of some \$700,000, which goes to his son John.

"The New South."

This is the title of a book gotten up by M. B. Hilliard, and recently published by the Manufacturers' Co. of Baltimore, Md. Looking over the pages of this book, one is surprised at the natural advantages possessed by the 13 Southern States in an industrial point of view, as well as at the progress made of late years in the development of their material resources. Measured by that progress, well may that section of the Republic be termed "The New South," for in all that pertains to its physical prosperity it is essentially new. Even in the habits, spirit and aspirations of its people it is new. They do not think the same thoughts, nor are they confined to the same narrow routine of business as of old. New interests and industries have everywhere grown up and a new future awaits them. From being a mere planting they are fast becoming a manufacturing and a mining people. Agriculture is also being diversified. Besides cane and cotton they are beginning to grow Indian corn and the other cereals largely. Fruit-raising, too, is being greatly varied and widely engaged in.

In 1886 there were grown in this "New South" 176,000,000 bushels of corn, 53,525,000 bushels of wheat, and 78,675,000 bushels of oats, whereas the product of corn was, under the old order of things, greatly less, while that of the other cereals mentioned amounted to almost nothing at all. In 1887 the yield of these grains was much larger than that of the preceding year. But with such increment of these crops the old agricultural staples of the country have not fallen off. The product of cotton and sugar has all the while been growing larger. The cultivation of the semi-tropical fruits, a thing unknown in the South 20 years ago, is now being practiced there with great success; not only the orange and the lemon, but the citron, banana, mango, pineapple, coconut and the date palm, being grown in the southerly tier of these States on an extensive scale, the more hardy fruits, such as the apple, plum, peach, etc., being everywhere raised without trouble and with much profit, both the soil and the climate showing themselves to be possessed of capabilities that only a little while ago were not even dreamed of. Even the pine woods of North Carolina it is found can be made to yield something besides "pitch, tar and turpentine."

But it is in the development of her mineral resources that the South is beginning to most distinguish herself. It is in her vast deposits of coal and iron, all of good quality and existing in close proximity to each other, that this region will hereafter be likely to find its greatest enrichment. It is stated in this book that a ton of iron costing \$15 in Pennsylvania can be made in Alabama for \$7.50, both this State, as well as Virginia and Tennessee, being now large producers of this metal. In 1880 these three States turned out only 178,000 tons of pig iron; in 1885, the output reached over half a million tons, which quantity has since been more than doubled. And yet the business is in its incipency.

The extent of the coal deposits of the South is, according to this authority, absolutely astounding. The "Warrior" coal-fields of Alabama are two-thirds as large as the entire coal-bearing area of Great Britain, containing, it is claimed, one thousand million tons of coal, at the lowest calculation. The value of these deposits is vastly greater than that of all the other land in the State. In 1870 all the coal raised in that section of the Union amounted to only a little over 3,000,000 tons. In 1880 the quantity had doubled; in 1885 the output of 1880 had again more than doubled, having amounted to 14,511,539 tons, the increment since having been in nearly the same ratio. While the manufacture of coke has not increased at the same rapid rate, it has, nevertheless, been very marked. The annual product of this fuel approximates now 2,000,000 tons, while in the coking districts new ovens are being put up as fast as possible to meet the constantly increasing demand for this fuel.

In the various branches of manufactures, especially in cotton, the "New South" is also making rapid strides. They have now running about 400 cotton-mills, operating over a million and a half spindles and fully 30,000 looms. The progress made by the South since 1880 in this department of industry has been at the rate of 104.5 per cent against 21.3 per cent in other parts of the country. Railroad-building has

there been advanced at the same rate, Texas having in this respect been the leading State. The material progress of the South during the past two decades has, in short, been phenomenal, and should it continue to forge ahead as it has been doing of late, the North and the West will find in these Southern States a very formidable competitor in many of their leading industries.

Foundry Notes.

On Monday afternoon at the Union Iron Works the first steel plate was hoisted for the keel of the San Francisco, a steel cruiser resembling the Charleston, but larger by 400 tons and having more powerful engines, and also the advantage of sail power, which the Charleston has not. Work also still continues on the cruiser Charleston recently launched.

The 30-ton boiler recently made in this city at a cost of \$20,000 for the steamer North Pacific, was dropped overboard at Tacoma while being landed from the steamship. It broke through the guards of the steamer and sank in 30 feet of water. Divers are at work recovering the boiler.

The committee of the striking boilermakers waited on President Taylor of the Rison Works and offered to go back to work if Superintendent Anderson were dismissed or suspended for three months. Mr. Taylor refused to entertain the proposal, and the men, after another conference among themselves, asked if they would be taken back as a whole, as if nothing had happened. This was agreed to and the men returned to their work.

On Saturday last the new steel tug Active was launched from the yard of the Union Iron Works. The tug is a beautiful model, somewhat smaller than the Relief. Her dimensions are, length, 100 feet; beam, 22 feet; hold, 13 feet. She will be fitted with compound engines, the cylinders of 20 and 38 inches diameter, with a 24-inch stroke. The Active is the first steel tugboat built on this coast. Her boiler is 13 feet 6 inches in circumference and 12 feet 6 inches long. Her propeller is 9 feet 6 inches in diameter. She will carry 115 pounds of steam and make 14 knots an hour. Her draught of water is 12 feet aft and 8 feet forward. She is all steel except the captain's room and pilot-house, which are of teakwood, finished with cherry and ash panels. She will consume 10 tons of coal in 24 hours, and will carry 65 tons in her bunkers. She is divided into compartments by five water-tight bulkheads.

The new steam schooner Protection, recently launched, is 158 feet long, 31 feet beam, and 10 feet 6 inches depth of hold. The engines were built by Savage & Sons, and are compound, with a 20-inch stroke. The wheel is 8 feet 6 inches, and the boat is calculated to steam when loaded about 10 knots an hour. The owners are the Navarro Mill and Lumber Company, and the Protection will carry lumber between this port and Navarro Ridge.

The stockholders of the Rison Iron and Locomotive Works held their annual election at the office of the company on Monday, corner of Beale and Howard streets, and re-elected the following officers for the ensuing year: Wm. H. Taylor, president; Robert S. Moore, vice-president and superintendent; Lewis R. Meade, secretary.

CON. CALIFORNIA AND VIRGINIA.—The bullion report of the Con. Cal. and Virginia for the month of July is as follows: There was worked at the Morgan mill 4950 tons of ore; bullion produced—gold, \$55,368.23; silver, \$70,412.77; total, \$125,781. Yield per ton—gold, \$11.18; silver, \$14.22; total, \$25.41. Assay value of the ore per ton, per battery samples, \$36.60. Worked at Eureka mill, 2950 tons of ore. Bullion produced—gold, \$37,461.39; silver, \$43,429.87; total, \$80,891.26. Yield in bullion per ton—gold, \$12.69; silver, \$14.72; total, \$27.42. Assay value of the ore per ton, per battery samples, \$34.85. Total ore worked, 7900 tons. Total bullion produced—gold, \$92,829.62; silver, \$113,842.64; total, \$206,672.26. Average yield in bullion per ton—gold, \$11.75; silver, \$14.41; total, \$26.16. Average assay value of the ore per ton, \$39.95.

THE quartz mill at the Deadwood mine, Willow Valley district, Nevada county, was burned on Tuesday night. Loss \$10,000. The mill has been used lately for custom work.

Prospecting in Alaska.

The residents of Alaska are quite hopeful of the future of the mining industry in that great Territory. Within the past few years attention has been directed there, and the success of the Douglas island ventures has caused further prospecting and development. Recent sales of mining property show that there is a feeling of more confidence than formerly. It is asserted, moreover, that the Canadian Pacific R. R. Co. has bought lots for wharves at Juneau, and will put a new line of steamers on the Alaska route. This will give direct communication with Eastern cities. Now about all the Alaska trade is done with this city by means of the Pacific Coast Steamship Co. It may be new to many to know that San Francisco is several hundred miles east of midway between the easternmost and westernmost shores of the United States. Yet this is the case. It is nearly 4000 miles from the longitude of the most western of the Aleutian islands, directly east to San Francisco, while it is not over 3500 miles from here to the longitude of the east coast of Maine.

While Sitka is the capital of Alaska, Juneau is the chief settlement and the headquarters of the mining business. Juneau is 150 miles south-east of Sitka. Three small creeks on the shore of the mainland lead to basins back of the mountains, where rich placers have been worked for several seasons. The best time to visit Alaska for pleasure is from May to September inclusive. Prospectors and miners take either the April or May steamers, so as to be on the ground when the snow melts.

It is in Southern Alaska that the mines have been discovered. The general width of the section is something over 100 miles, and the land surface about 40,000 square miles. The general substratum of the whole country is a hard granite, reached at a very little distance below the surface, though in many places are wide expanses of alluvial soil, which seem to have been formed by the deposits of rivers. The land generally rises abruptly from the water's edge, and is piled up in ridges and mountains, broken only where the numerous and narrow water-ways cut through. On the mountain-sides the only soil that is found is a spongy mass that seems to have been generated of the vegetable deposits of centuries past, and holds in its network the debris of the forests that have reached their growth and tumbled into decay and now lie entangled in every stage of decomposition, making traveling very difficult. All the mountain-sides are covered still with a dense growth of timber. This extends to an altitude of from 1500 to 2000 feet, and the peaks which rise above are bare of vegetation, except the moss. The shores are very rocky and the inlets deep.

The slate formation is found almost everywhere and ledges are found in many places, though but few have been developed. At Silver Bay, near Sitka, a gold-mining company began work about nine years ago, and after putting up a mill, failed. Near by, however, a Wisconsin company is at work developing. On Douglas island is the big mill of the Alaska Mining and Milling Co., turning out about \$70,000 a month. They have both water and steam power, and are well equipped. This is a San Francisco company. At Silver Bay basin, on the mountain three miles above Juneau, is a placer district, which has been worked since 1881. By way of Wrangel, in Southeastern Alaska, is the only accessible approach to the Cassiar mines. There are placer mines at the Junach river, in the extreme south, and at the Shuck and Sum-Dum, near Juneau. For several years past parties have penetrated the interior from the head of Chilcat inlet and prospected along the headwaters of the Yukon river. Gold has been found there, and this spring there was quite an excitement about the placers. There is much country yet to be prospected.

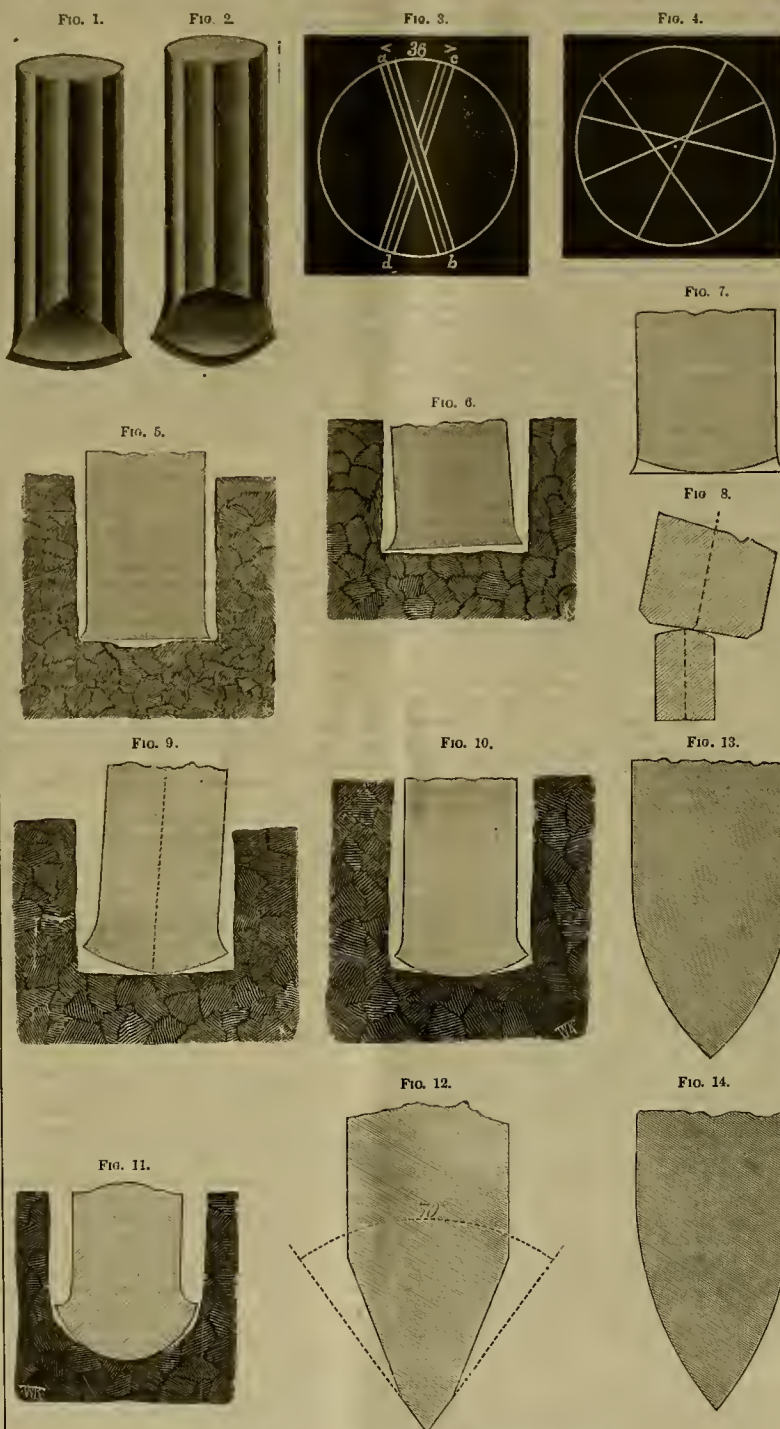
There is no means of getting about Alaska except in canoes. There are no railroads or wagon-roads and very few trails. But there are numerous rivers and streams, and transportation is all by canoes. Prospecting is difficult and laborious. For the work of prospecting, a boat or canoe is the first necessity, and it should have a good sail and be fitted with the means of securing goods against rain and wave. Besides a boat, a good hut large enough to shelter the entire party should be provided. Bear-skins are used to protect the

body from the dampness of the ground. After this a stout rain-coat and gum-boots come next, and the remainder of the outfit, as to tools, provisions, etc., can be according to preference and means. There are few stations, so plenty of grub must be provided. There is plenty of rain, and mosquitoes are abundant and annoying. The density of the forest growth, the tangle of underbrush, and the thick carpet of moss that covers every inch of ground, has made prospecting slow and difficult. It is hard to clear even a patch of ground to get at rocks. Croppings must be held to be seen at all. It is no wonder, under the circumstances, that de-

Hand-Drilling.

There are many forms of hits used in pointing drills for mining. Figs. 1 and 2 of the accompanying cuts show the curved chisel-bit in ordinary use, which has been proved by the experience of hundreds of years to be the best for ordinary hand-drilling. Mr. Henry S. Drinker in his work on "Tunneling, Explosive Compounds and Rock Drills" (from which we take these figures) considers this form of hit carefully and explains why it is so effective.

Take a purely straight-edge hit as shown in Fig. 5 and consider that in Fig. 3 the white lines



FORMS OF POINTS OF MINING DRILLS.

velopments have been so slow in Alaska. Few people have gone any distance away from the water-courses, owing to the difficulties mentioned. The season for mining is comparatively short, and in the interior it is very hot indeed in summer and cold in winter. On the coast the winter is not severe. The rainfall all over the country is generally very large, and moisture and dampness prevail in ground and atmosphere.

PAY-ROLLS of the Comstock mines last month amounted to \$220,000. The largest single amount was that of Cons. Cal. and Virginia—\$44,000. Confidence paid \$1700 and Hale & Norcross \$12,000. The Carson river mills paid out \$15,000 for labor.

At Eureka the Richmond mine has closed down and will not resume operations for many months. The Eureka Con. mine and furnaces are running steadily.

show successive cuts made by it in turning. Theoretically, the drill is turned on a center in the middle of the hole; practically the successive cuts cross each other a little as shown in Fig. 4, the hole being necessarily broken a little wider in diameter than the extreme middle of the hit. In either case we see how vastly more work the drill has to do at the circumference of the circle than at the center, and therefore a straight-edged drill, as in Fig. 5, will soon be worn more at the ends (Fig. 7) than the middle of the edge, and it will naturally approximate to the curved edge, which, if originally adopted, therefore gives the most uniform wear.

There are also considerations affecting the form of the edge. Theoretically speaking, the drill is always supposed to be held vertically in the hole and the blow is further supposed to be given directly on the head of the drill, the axis of the hammer at the moment of impact being perpendicular to the axis of the drill.

In practice, however, the drill may be often held at a slight angle as in Fig. 6, and the blow is, besides, often given in axially as in Fig. 8; these results also tend to a rounding of the straight edge, if used as in Fig. 6. Fig. 9 shows that with a rounded edge an inaxial blow will take effect nevertheless on the body and not on the end of the edge; in other words, the more the edge is curved, the more nearly will inaxial blows take effect at the center, and the practical mean to be reached is on the one somewhere here between a flat edge and a diamond point; the amount of curvature as well as in the tempering of the steel must be adapted in each case to the material to be drilled. Thus, in hard ground a flatter curve and in easier ground a sharper curve will be found best, varying perhaps from Fig. 10 to Fig. 11.

It has, in fact, been found by experience, says Mr. Drinker, that: (a) Straight-edged drills blunt quickly at the corners; (b) Edges with too sharp a curve blunt first at the center; (c) Edges with light curves are best adapted to hard, and those with sharp curves to easier ground; (d) The proportion of the extreme width of the hit to the diameter of the drill may vary from 7:6 to 4:3. In easy rock the shoulder of the edge need not be so great as in hard, as the ends are not subjected to so great a strain. (e) The angle of the two faces may be put, at the highest for strong drills in hard work, at say 70° as in Fig. 12. In hard ground, however, the drill should be rather rounded, as in Fig. 13, to give support to the point, and in very easy material (hard earth, etc.), where a crushing rather than a cutting edge is needed, it is well to slightly blunt the edge, as in Fig. 14.

TIMBER AND MINERAL LANDS.—A civil suit is to be commenced against the Eureka Con. Mining Company, operating in Nevada, to recover \$3,670,741. The sum, it is alleged, represents the value of charcoal and cordwood manufactured from cedar, pine and mahogany timber unlawfully cut from public mineral lands in Nevada by or with the guilty knowledge of the Eureka Company. Criminal proceedings are recommended against Henry and Donnelly, superintendents of the company's mines. These recommendations are made upon a report by Special Agent George D. Temple, who has just concluded his investigation of alleged timber depredations in Nevada. The commissioners admit that it was lawful to cut timber from public mineral lands for mining purposes, but asserts that the company has violated the law respecting the protection of young trees and has ignored certain rules prescribed by the General Land Office. Hence he recommends the suits as stated.

ACADEMY OF SCIENCES.—At the last meeting of the Academy, donations to the cabinet of curious shells were received from W. S. Wood, and of stone axes, spear-heads, knife-sharpening stone, earthen pots, of bone needles and hooks found at Los Muertos from Professor Frank Cushing. The librarian reported that since the last meeting 164 books had been added to the library, 21 by donation, 143 from correspondents. Frank H. Vasil was proposed for membership. A communication was received from Professor E. S. Holden of the Lick Observatory, inclosing a paper relating to observations he had recently made in regard to active volcanoes in the moon. F. Gutzkow gave an explanation of the manufacture of magnesia from sea-water.

CLARENCE COULTER returned from Sitka during the week, and made so favorable a report of the Takou mine that his father, Samuel Coulter, purchased it for \$45,000, George Harris of Seattle taking one-third. The owners propose stocking the mine and erecting a ten-stamp mill. Clarence and his family leave immediately for Juneau, Alaska. These gentlemen are interested in the Swinden mine near Gold Hill.—*Jacksonville (Oregon) Times*.

OWING to the scarcity of water in the Carson river, nearly all the mills have shut down for the summer, the consequence being that hundreds of Comstock miners have been thrown out of work. One hundred men were drafted from the Yellow Jacket recently, and several hundred from other mines were also laid off.

A REPRESENTATIVE of Denver, Colorado, ore-buyers is visiting Nevada mining towns with a view of contracting for ore to be shipped to Denver.

MECHANICAL PROGRESS.

Further Improvement in Basic Steel.

London *Iron* of July 13th gives the particulars of another important improvement in the method of production of basic Siemens steel, which has just been put in operation at the Staffordshire Steel & Ingot Company's works at South Staffordshire. We condense the same as follows:

This improvement effect increased economy and increased efficiency in working. The new furnace has just been started, with the most excellent results, while an important advance in the method of manufacture has been accomplished. The old furnace, which was round, has been superseded by a rectangular furnace with rounded ends, so that the flame, being longer, does not seem to have such a destructive cutting power upon the lining and upon the gas and air ports. The internal dimensions of the furnace are 16 feet 6 inches length by 10 feet 6 inches wide, and will produce a cast of 9 tons 10 cwt. of ingot metal. The roof and part of the internal side-walls are built of silica bricks, and the bottom is lined with basic bricks separated from the silica work with a chromic brick. This basic bricks are of exceptional density, being made by a new machine of German manufacture, which exerts a pressure of 4500 pounds upon the square inch.

Another important alteration is that the roof, instead of being movable, as before, is fixed. The movable roof was designed to enable repairs to the interior of the furnace being the more easily made, but in practice it has been found that this advantage was more than lost by the destruction which ensued to the roof by removals. Silica brickwork, it has been found, will not stand intermittent heat, since the cooling and subsequent reheating, after first being subjected to intense heat, renders it very frail and brittle. The expansion of the silica work under heat is so great that, to preserve it intact, it must be kept at one uniform temperature or thereabout. Another improvement is, that instead of being provided with only one door in the front for charging and testing purposes, the furnace is furnished with three doors in the front, and one at the back over the tapping-hole, which renders the working much easier and more convenient.

The regenerative arrangements connected with the furnace show even greater improvement than the furnace itself. Previously, the two air and two gas regenerators were of circular shape, and were entirely independent of each other to prevent the air and gas mixing. It has now been found that this object can be secured, and considerably over 100 per cent more regenerative capacity obtained in the same space, by making the regenerators, like the furnace, rectangular, with rounded ends. Where, before, the regenerative flue heated 4000 bricks, it now heats 10,000. The diameter of the gas regenerator before was 5 feet, and the air regenerator 5 feet 6 inches; now each is 8 feet 6 inches in diameter by 9 feet long. Instead of being independent of each other, they are now connected by wrought-iron plates, which arrangement both economizes room and gives a larger regenerative area, and any mixing of the two elements is prevented by the erection between the regenerators of a firebrick wall 20 inches thick, with 3 inches of sand space.

The economy which results from this alteration in the form of the regenerators is remarkable. With the short furnace previously at work, some of the heat passed into the chimney, and was lost, but the longer flues now possible absorb the entire heat from the furnace, besides which it is possible to work with less gas while obtaining a greater amount of heat. A greater production of ingots with a lessened production of coal is now effected. Where before the coal consumption was 25 cwt. or more per ton of ingots produced, it is now only 14 or 15 cwt., and it is expected that this will be further reduced. The air and gas enter the furnace at an immense heat, and where combustion takes place the heat is approximately estimated at close on 4000° F. An important economy in the materials charged has been effected by the substitution for heat Spanish ore and scrap of basic cinder, produced at the mill-reheating furnaces. To produce a cast of 9 tons 10 cwt. of ingots, the charge consists of 10 tons 10 cwt. of basic pig, 15 cwt. of cinder and 15 or 16 cwt. of line. This can be melted down in 2½ hours, and the metal is ready for tapping in the remarkably short time of 7½ hours from the time of charging. The management hope that they may be able to run 100 charges before the furnace wants relining, though it is yet too soon to pronounce definitely. The new furnace will add to the ordinary basic output of the works some 120 tons per week.

SPIRALLY WELDED STEAM PIPE appears to be fast coming into use at the East. These pipes are made by winding steel or iron spirally and hammer-welding the overlapping edges. They are made of any desired weight of metal, of diameter above three inches up to as high as 48 inches, and of any length that can be transported. They are proved to be safe under all pressures which standard wrought-iron tubing of corresponding diameters will carry, and are adapted to all uses for which metal pipes are employed; they possess conspicuous utility and combine great strength and perfection of workmanship with an economy in material hitherto

regarded as impossible in the production of pressure pipe. In the matter of durability they are warranted to be at least equal to any other pipe of similar quality. Spirally welded steel and iron tubing enters the market as a practical competitor of wrought iron and cast iron pipes of corresponding diameters for any use for which they are not adapted. It is claimed to be a cheaper pipe than either lap-welded wrought iron or cast iron, and is as much better than any form of riveted pipe as a perfect hammer weld is better than a line of rivets. It is of uniform strength and of full inside diameter. Freight and labor charges are large items in the cost of pipes ready for use. The lightest of the pressure pipes hitherto offered have entailed formidable freight charges if moved any distance, and the labor of handling and connecting them has further swelled the total, until in many cases the cost of the pipe at the mill has been doubled or trebled before it came into use. Lightness, if attained without the sacrifice of strength, is a quality which all consumers will appreciate. The comparative weights per foot of spirally-welded pipes of different gauges, lap-welded pipes and cast-iron pipes, will show the advantage of the former in transportation and handling.

Does Machinery Wear Out?

It hardly seems possible that machinery, such as is constructed to-day, of the best material and by careful workmen, should ever wear out, and it is quite safe to assert that it never does; it simply becomes out of style, and the rapid progress of the times makes its discarding or replacement by new and improved machinery necessary, in order that the manufacturer may keep pace with the times and be able to enter into the market with his goods against the competition that such machinery creates.

It is a matter of some wonder, at first sight, as to what becomes of all the new machinery that is being made and put upon the market by the ever-increasing number of manufacturers, who are yet unable to keep up with the demand for their products. A shop or factory, fitted up with new machinery, might be supposed to last for years without replenishing, except in the matter of ordinary repairs, and it is hardly possible to suppose that there are enough new enterprises started up to employ all the machinery that is being turned out.

This is an age of progression and competition, and in order to keep up with the times and stand an equal chance with others in the race, it is necessary for a man to be constantly discarding the old and adding the later and more improved styles of machinery. The machines are not worn out, but have gone out of style, and their employment is continued only at a sacrifice.

The one great object of the present time is to save money on the part of the purchaser by buying where it can be done the cheapest, and on the part of the manufacturer to produce and put on the market his goods as cheaply as possible, and at the same time with as much profit to himself as can be made. In order to do this, all the skill and ingenuity of modern Yankeeism are called into service, and inventions and contrivances innumerable are brought out and offered to the trade, who ever watching for such improvements as offer any advantage in quality, quantity, or profit in manufacture, and when such a thing is shown to be a success it becomes a necessity, and when once adopted must be generally utilized, or failure so to do is sure to bring disaster and ruin.

The old machines are discarded or replaced by the new in the eager pursuit of increased facilities and wealth.

This, then, is the answer to the query above. Machinery does not wear out, and it is not this fact that makes the demand for new and improved implements, and furnishes the scores of factories with work in their construction. It is one of the marks of our progressive age, and not the demand, which furnishes the material for the above article.—*Practical Mechanic.*

A PETROLEUM ENGINE is now being exhibited in England and is attracting a great deal of attention. The petroleum is placed in a tank in the bed of the engine and is forced through a pipe into an apartment where a blast of air turns it into a fine spray. A small battery in the rear supplies an electric spark, and the spray coming in contact with this electric spark furnishes the motive power. This engine is said to be very simply constructed and works with admirable regularity. The piston needs no oiling, the petroleum vapor filling this necessity.

PALLADIUM, a metal of the platinum group, but of a far lower density than the latter, may be substituted for steel in the manufacture of watches. Palladium is absolutely non-polishable, and it is unaffected by any noticeable extent by the presence of a magnetic field. Besides this, it has the incidental advantage of being rust-proof. This discovery is due to C. A. Pallard of Geneva, Switzerland, and watches are now being constructed there of this metal.

COMPOUND AIR-POWER IN PARIS.—The length of pipe laid in Paris for the distribution of power by compressed air already exceeds 30 miles. The compressing engines are of 3000 horse-power, and about 3,000,000 cubic feet of air are compressed daily to a pressure of 80 pounds per square inch, at an expenditure of 50 tons of coal.

SCIENTIFIC PROGRESS.

The Magnet.

The natural magnet or loadstone is an ore of iron, every molecule of which is composed of three atoms of iron, combined with four atoms of oxygen gas. This loadstone has the power of attracting small pieces of iron, and, if balanced and suspended will point nearly north and south.

Artificial magnets are pieces of iron or steel which have been under the action of either the loadstone or other magnets, or of an electric current, or have been subjected to percussions while in certain positions.

Permanent magnets are those which retain their magnetic properties permanently. They are made of hard steel, in bars, or bent in the form of a horseshoe.

Temporary magnets are those which retain their magnetic properties only as long as they are under the influence of other magnets or an electric current. They are bars of soft iron, either straight or bent like a horseshoe.

The poles of a magnet are the two points of greatest attraction and repulsion. They are at the two ends.

Magnetic polarity.—Balance a horseshoe magnet by tying a thread around its middle and suspend it. It comes to rest nearly north and south. Call the end pointing north the north-seeking pole, and the south the south-seeking pole. Take a strip of steel which has been rendered magnetic by discharging a Leyden battery across it, and suspend in like manner. It will also come to rest nearly north and south. Place a strip of cardboard over a horseshoe magnet lying on a table. Scatter iron filings all over the cardboard and tap it. Notice the curves of the poles. Move the magnet under the cardboard and the filings will move like a lot of insects.

Take a strip of steel, and draw it from end to end over a strong magnet. The strip of steel becomes a magnet. Balance and suspend it by a thread, and do the same with a horseshoe magnet. Bring the north-seeking end of the horseshoe, and it will be repelled. Again, bring the north-seeking end of the strip to the south-seeking end of the horseshoe. Attraction will now take place. This shows that unlike poles attract, and like poles repel one another.

Heat red-hot an iron ball, and suspend it by a thread. Bring a pole of a powerful magnet near to the ball, and the latter will not be attracted. Keeping the magnet in the same position, wait until the ball has cooled, and when sufficiently reduced in temperature it will be attracted. This shows that, when red-hot, iron cannot be magnetized.

How to make an electro (temporary) magnet out of a horseshoe of soft iron. Take a piece of insulated copper wire and coil it around one of the arms of a horseshoe of soft iron in a left-handed helix. After making doubly by coiling in the same direction, pass over to the other arm and coil the wire in a left-handed helix backward and forward once. Connect the ends of each wire with the two plates of an electric battery, and the horseshoe will become a strong magnet.

Sunspots and Temperature.

A careful study of the solar orb by astronomers has developed the fact that there is a period or cycle of 11 years in the presentation of those phenomena on its surface known as sunspots. All scientists agree that the greater the development of these mysterious spots on the luminous envelope of the sun, or photosphere as it is technically called, the greater the activity underneath the envelope, and the greater the activity of the sun, so much the greater the heat that is thrown off. Those years, therefore, when the greater number of spots are visible on the sun's face are periods of extraordinary physical disturbances in that body, and the seasons are accordingly usually notable for a prevalence of high temperatures. On the contrary, when the sun is in a state of repose, or the minimum of the 11-year cycle has been reached, low temperatures are the rule.

The year 1857 was the end of an 11-year cycle, and the sun was notable for the scarcity of spots which presented themselves. Some scientists now associate the intense cold of last winter to the absence of sunspots during the previous summer, which was accepted as evidence that the sun was in a state of repose and throwing off the minimum amount of heat. As a matter of fact, the winter was one of the severest on record throughout the Northern Hemisphere. The memory of the blizzards in many of the Western States is still fresh in the minds of the public. Many fatalities occurred in these States and in some of the European countries through the severity of the cold. Even in California the thermometer reached a point lower than any before recorded.

The close of this sunspot cycle, assuming that the low temperatures of last winter were the manifestation of it, has been of some value to this State. For example: It has afforded through the experience of the South of France, whose climate has been frequently likened to that of California, an opportunity of making some interesting comparisons. The South of France, in common with Northern Europe, was visited during the winter by a period of unusually low temperatures, and many of the more tender kinds of vegetable growths were subjected to very severe tests. It appears

that many plants which have never suffered severely from frost in California were killed in the South of France by the cold last winter. Among them were several varieties of eucalypti, and specimens of California redwood and sequoia, which were killed outright by the frost. Some varieties of eucalypti survived the winter without injury, showing their adaptability for cultivation within the frost line in the temperate zone. In California the heaviest frost on record merely scorched the leaves of the tenderest varieties of the eucalypti, but neither the magnificent forests of redwood along the coast ranges nor the Sierra groves of sequoia suffered in the slightest degree. These are positive illustrations of the fact that the climate of California is milder than that of the South of France, and that whatever can be grown in that favored region is sure to succeed quite as well if not better here. If these sunspot cycles have no other value, then, than that of furnishing opportunities for making climatic comparisons, they are of much interest to California, and their progression and effect may be observed with considerable profit.—*Exchange.*

THE OSCILLATIONS OF HIGH CHIMNEYS.—In the *Memoires de la Société des Ingenieurs Civils* some particulars are given of the oscillations of a chimney-stack near Marseilles, 35 meters (115 feet) high, with an exterior diameter at the top of 1.22 meter (four feet). During a severe storm it was determined, by observing the shadow of the chimney, that its greatest oscillation was half a meter (nearly 1 foot 8 inches). It was further observed that a chimney set in motion by a gust of wind oscillates from four to five times backward and forward until it is at rest again. M. E. Burg asserts that, should this momentum during the oscillations of a chimney repeat itself in such a manner that its direction coincides with that of the oscillation, the overthrow of the chimney may be expected. This is the explanation given for the destruction of many a chimney constructed in accordance with sound principles of stability. The *Oesterreichische Zeitschrift für Berg und Hüttenwesen* adds to this statement the qualification, that in the case of a chimney near Vienna 50 meters (164 feet) high, and constructed of concentric (hollow) rings, with an inner diameter at the top of two meters (6½ feet), which is exposed to considerable gusts of wind, the oscillations were most carefully and repeatedly measured with a theodolite, when the observations showed an extreme oscillation of only 16 centimeters (6½ inches) during severe storms.

RECORDING MOVEMENTS AUTOMATICALLY.—In the very useful scientific methods whereby movements record themselves in curves automatically by a point moving on a smoked surface are, perhaps, those which yield the most delicate curves. In the French Sociétés d'Encouragement, M. Mascart has called attention to a useful modification by M. Fenon, in which a bent tube of tempered steel forms a siphon dipping at one end in a reservoir of ink and at the other being shaped like a pen-point, which is brought near the moving paper (the sloped section outward). Capillary force prevents outflow when the apparatus is at rest. A fine trace is produced by this pen, without interruption by the most rapid displacements and without sticking when at rest. M. Wolf of the Paris observatory has used the system for getting records of air pressure, temperature, wind, etc., with the best results. The reservoir needs charging only once a week, and, using inks mixed with glycerine, a single charge has been found to suffice for a barometer record of more than six months.

ORIGIN AND CHARACTER OF METEORITES.—From an exhaustive study of the very large collection of meteorites at Harvard College, the conclusion has been arrived at that many of the masses of meteoric iron now known are cleavage crystals, broken off, probably, by the impact of the mass against the atmosphere. It is found that these masses show cleavages parallel to the plane of all three fundamental forms of isometric or regular system. From all that appears, the theory has come to be entertained, in respect to the origin of meteorites, that the masses were thrown off from a sun among the fixed stars, and that they were slowly cooled while revolving in a zone of intense heat.

INFLUENCE OF FORESTS ON MOISTURE.—President Willits of the Agricultural College of Michigan, while he disputes the exercise of a direct influence of forests in promoting moisture—saying that all the trees in the world will not put it where it is not—believes that the moisture on the continent is advancing toward the west, and that the planting of forests and increased cultivation will cause the rainfall to advance farther west every year. Seven hundred thousand acres of forest have already been planted in Nebraska—the cottonwood and the willow first, and then the soft maple and the hard woods.

STRYCHNINE FOR DRUNKENNESS.—A Russian physician declares that strychnine is an infallible cure for drunkenness, administered in subcutaneous injections. The effect of the strychnine solution is to change the craving for drink into positive aversion, and this change is effected in a day. After a treatment of eight or ten days the patient may be discharged. The strychnine is administered by dissolving one grain in 200 drops of water, and injecting five drops of the solution every 24 hours.

GOOD HEALTH.

Breathing in Smoke.

An exhibition was recently given in Westminster, near London, England, of Loeb's appliances, says *London Engineer*, which are designed to enable the wearer to breathe and work with comfort in dense smoke, and also in poisonous gases. The appliance consists of a respirator with an india-rubber mouthpiece. The respirator is held by two projections, which are grasped between the teeth and a flange, which lies between the teeth and the lips, additional security being provided by an elastic band passing round the head. The air is drawn in by the wearer through a series of small filters, containing respectively wet sponge, cotton wool, cotton wool damped with glycerine, and animal charcoal. These filters are very lightly packed, so that there is no resistance to the act of inspiration, and they are provided with valves which direct the air expired from the lungs into the external atmosphere. The entire apparatus weighs less than a pound, and can be used without previous practice. When it is to be employed in an atmosphere which is deadly in its character, as in the choked camp of mines, the air is drawn from some place where it is pure, through a light india-rubber tube. The filter is then strapped to the waist of the wearer, and the respirator merely contains the valves which cause the air to be drawn through the pipe and then to expire into the atmosphere. A tube up to 100 feet in length can be used with facility. Protection is afforded to the eyes by a pair of spectacles with india-rubber rims, which press tightly on the cheek and brow, and exclude all smoke. Mechanical wipers are added, to enable the glasses to be cleaned without removal. A man wearing the respirator spent half an hour in a building filled with dense smoke of a most pungent character, without any difficulty, and afterward the inventor's representative, with the aid of a flexible air pipe, entered a room containing a dish of burning sulphur and remained there some time. It was clearly demonstrated that the respirator would enable the wearer to enter a building filled with smoke and discover the exact position of a fire. A few buckets of water promptly applied under such circumstances will do more good than the jet from a steam fire engine directed at random. On board ship, where the result of a fire is to fill the hold with smoke, this respirator would be most useful, and this fact has been recognized in the German navy, where Loeb's respirators form part of the official equipment. Many of the German fire brigades have also adopted them. They are being introduced into this country by the Fire and Mining Appliances Syndicate, of 49 Queen Victoria street, E. C.

Care of a Cold.

A cold is a departure from health, and should really be attended to at once. Do not let it cure itself. Get rid of it soon. Do not feed it, though, but starve it. One cold after another nearly always ends in the thickening of the mucous membrane of the bronchial tubes, and before you are aware of it you become the victim of winter cough.

The morning thill (cold, I mean) is a very sure preventive of colds. Never overclothe or overheat yourself. The neck should be kept cool. Keep away from fire indoors if you are subject to colds.

Cough, if not the result of simple laryngeal or bronchial catarrh, may mean a very serious departure from health; and the sooner one sees a doctor in such a case the better. Do not be afraid to consult him. Remember, it is only those that delay who suffer in the end. I do not advise you to rush away to a physician with every trifling ailment, but—it is better to be sure than sorry.

Many people would benefit much by taking codliver oil for a month or six weeks about the change of the season. Probably the diet would have to be lowered a little, and an occasional mild aperient taken.

Getting thin is another serious departure from health. One generally does lose weight in winter and regain it in summer; but a slow and steady decrease in weight calls aloud for medical interference.

Want of sleep and restless nights are symptoms which cannot be overlooked. The cause must be found and removed. The trouble may certainly arise from overwork and worry combined, but in most cases the stomach and digestive system are the roots of the evil.

Nervous people worry most, but they also work most. Well, the question one is inclined to ask himself when he feels something wrong with his health is: "Am I overworking myself?" I would answer thus: If you really enjoy working, it cannot injure you very much; but, on the other hand, if it is forced work, and you find little pleasure in it, then it will tell on your constitution.

But many people cannot afford rest. Well, but wonder can he done by taking exercise; by breathing only fresh air night and day, indoors and out; and by careful regulation of the diet. In conclusion, let me entreat of you, as you value your happiness, not to neglect first departures from health. The story of the reservoir has really a moral for every one of us.—*Cassell's Family Magazine*.

SMOKING AND DIGESTION.—It is very unusual to find in a great smoker a healthy appetite for

plain food, and medical opinions may be had in any number as to dyspepsia caused by smoking. To whatever degree the habit affects the nervous organization, it appears to be certain that the process which is regarded as soothing is really destructive. Sir Benjamin Brodie must have known what he was writing about when he declared that "the poison of tobacco acts by destroying the function of the brain." In a Russian hospital in 1886 a Dr. Chadnowski took the liberty of examining by means of a pump the digestive powers of six smokers and as many non-smoking soldiers, and he recorded that "in the former the time required for digestion averaged seven hours, while in the case of the non-smokers the mean period of digestion was only six hours." With the present enormous consumption of tobacco the social consequences, apart from those concerning the bodily and mental powers of the consumers, are important.

HEIGHT OF SOLDIERS.—It has generally been believed that the reduction in the average height of French soldiers which followed Napoleon's wars, due, of course, to the immense slaughter in those campaigns, made all of those soldiers the shortest in Europe. But, according to a high medical and military authority in Russia, the minimum height of the Russian and French conscript is about five feet, while in most other European countries the minimum ranges from five feet one inch to five feet three inches.

HOW TO GROW OLD GRACEFULLY.—Activity without overwork, healthful living, moderation, self-control, the due exercise of all the faculties, the cultivation of the reason, the judgment, and the will, the nurture of all kindly feelings, and the practice of doing good—all things, in fact, which tend to build up a noble manhood—also prepare the way to a long life and a happy, blessed and graceful old age.

USEFUL INFORMATION.

HOW CELLULOSE IS MADE.—Most celluloid is made in France. A roll of paper is slowly unwound, and at the same time is saturated with a mixture of five parts of sulphuric and two parts of nitric acid, which falls upon the paper in a fine spray. This changes the cellulose of the paper into pyroxyline (gun-cotton). The excess of the acid having been expelled by pressure, the paper is washed with plenty of water until all traces of acid have been removed. It is then reduced to a pulp, and passes on to the bleaching trough. It is this gun-cotton which gives it its explosive nature. Most of the water having been got rid of by means of a strainer, the pulp is mixed with from 20 to 40 per cent of its weight of camphor, and the mixture thoroughly triturated under millstones. The necessary coloring having been added in the form of powder, a second mixture and grinding follows. This pulp is spread out in thin slabs, which are squeezed in a hydraulic press until they are dry as chips. Then they are rolled in heated rollers, and come out in elastic sheets. They are from that point worked up into every conceivable form. One can get celluloid collars, cuffs, hairpins, shirt-fronts, cravats, pen-holders, brushes and combs, inkstands, knife-handles, jewelry, and everything else almost that you can imagine. In Paris there is a room almost completely furnished in celluloid. The curtains, the furniture, the door-knobs, and even the matting were made of this material. To be sure, no matches were ever carried there. Indeed, the room was never used. It was only a curiosity, and the man who owned it owned the factory where it was made. These rooms will never be popular. Few men, even in this rapid age, care about being blown into the kingdom come in small fragments, scorched and scattered, and that would be the fate of a man who let a lighted match fall in such a room.

KEEPING COPPER PLATES CLEAN.—Louis Blanding, the metallurgist, has after many years of experimentation succeeded in accomplishing what may be regarded as one of the most important discoveries in all the broad range of metallurgical science. It is well known to all mining and mill men that it is most difficult even after they have been in use a considerable time to prevent the copper plates of batteries from oxidizing. Many solutions more or less acidulous have been applied to the plates, but hitherto with only negative success. The plates must be kept in a perfect condition of amalgamation to insure their retention of the gold, or amalgam, after coming from the batteries. The green spots commonly called *Verdigris*, but which are really oxide of copper, are fatal to amalgamation. Mr. Blanding's process consists of a chemical solution which coats very little, is easy of application, and most readily and positively effective. The green places in the copper are immediately deoxidized and at once receive the quicksilver. He intends to make application for letters patent for his discovery.—*Tuolumne Democrat*.

HOW TO SKIN AN EEL.—Skinning an eel is not a very easy thing to do, when one doesn't know how, but it is very easy if performed in the following manner: Make a cut around the neck, just back of the gills, through the skin; then another cut at right angles with the first one, two inches long; turn the corners and the rest of the skin up, like your shirt-sleeve, take a

dry cloth in the right hand and catch hold of the turned-up skin; with the left hand grasp the eel's head, then take a long breath, pull, and then wonder how nicely it comes off.

UTAH AND ITS RESOURCES.—The population of Utah is now about 200,000. Of this number about 55,000 are Gentiles. The Mormons follow agriculture mainly as a means of livelihood, while the Gentiles are largely engaged in mining, trade and the practice of the professions. The territory is 325 miles in length by 300 miles in breadth, and it consists of a succession of rugged mountains holding in their arms fertile valleys, some of great extent. The assessed valuation of the Territory, not including the mines, is about \$35,000,000, and of this amount the Mormons own about 60 per cent, the Gentiles 30 per cent, and the remainder is the property of railroads. Of the resources of the country, Judge Powers of Salt Lake City speaks with enthusiasm. He says: "We have pure alabaster, fine Carrara marble, magnificent granite, elegant brownstone and white sandstone right at our doors. We have 100 square miles of coal fields, mountains of copper and more mountains of iron. We have great beds of sulphur that range in purity from 45 to 99 per cent. We have two saltwater mines, the only ones in North America; lakes of horax, wells of petroleum and mines of rock salt. In addition we can manufacture pure salt for \$1.50 per ton from the Great Salt Lake. Salt Lake City has a population of 35,000."

A NEW FLAMELESS EXPLOSIVE.—Our English contemporary *Iron* gives an account of some tests of another new flameless explosive, for use in coal mines, called "Securite." It is the invention of Herr Schoenweg, and has been used in Germany for about two years past. "It is composed of a nitrated hydro-carbon in combination with certain oxidizing agents," which is rendered flameless by the addition of a certain proportion of an organic salt. It emits a spark in exploding, but this spark is harmless, not possessing sufficient energy to explode inflammable gases or coal-dust. By the action of the organic salt, the spark is almost instantly extinguished. In the tests mentioned, the flameless "securite" was exploded in vessels containing the most highly explosive mixture of gas and air, and, in some cases, this combined with coal-dust, but while gunpowder invariably causes their explosion, the flameless "securite" did not ignite the gas or the coal-dust, and it was demonstrated to be safe, even under more severe tests and conditions than are ever present in mining operations. One of the gentlemen making the tests gives it as his opinion that "flameless securite" is a most valuable blasting agent, and one which, if properly used, will give an assurance of practically absolute safety in mining work, so far as the communication of flame to the surrounding atmosphere is concerned.

A NEW SOLDER.—A soft alloy, which adheres so firmly to metallic, glass and porcelain surfaces that it can be used as a solder, and which is invaluable when the articles to be soldered are of such a nature that they cannot bear a high degree of temperature, consists of finely pulverized copper dust, which is obtained by shaking a solution of the sulphate of copper with granulated zinc. The temperature of the solution rises considerably, and the metallic copper is precipitated in the form of a brownish powder. Twenty, 30 or 36 parts of this copper dust, according to the hardness desired, are placed in a cast-iron or porcelain-lined mortar and well mixed with some sulphuric acid having a specific gravity of 1.85. Add to the paste thus formed 70 parts (by weight) of mercury, constantly stirring. When thoroughly mixed, the amalgam must be carefully rinsed in warm water to remove the acid, and then set aside to cool. In 10 or 12 hours it will be hard enough to scratch tin. When it is to be used it should be heated to a temperature of 375° C., when it becomes as soft as wax by kneading it in an iron mortar. In this ductile state it can be spread upon any surface, to which, as it cools and hardens, it adheres very tenaciously.—*Tradesman*.

BLOSSOMS ONCE IN FIFTY YEARS.—There was recently witnessed in the palmhouse at the Imperial Palace of Schonbrunn a spectacle which had previously been seen only once before in Europe—to wit, the palm tree *Brownia Ariza* in full bloom. This tree, which is named after the celebrated English hotaniat, arrived at Schonbrunn 40 years ago from London. It was then an insignificant sapling, but now it vies in magnitude with the Maria Theresa palmhouse. It blossoms only once in 50 years, and the bloom lasts only 48 hours. The last time the blossom of the *Brownia Ariza* was seen was in June, 1851, in the Duke of Norfolk's conservatory at Chiswick.

A BRAN PACKER.—A few persons are yet trying to invent a bran-packer that will be practical. The last heard from was in Gloucester, England. A great number of models and drawings of bran-packers have been filed in the office of the secretary of the Millers' National Association in Milwaukee, but none have as far been considered really worth putting on the market. The trouble seems to be not in packing in the required space, but in keeping it packed.

THE RUBBER TRUST doesn't work. In fact it has petered out, owing to the unwillingness of a large rubber manufacturer in New Jersey to enter the combination.

ENGINEERING NOTES.

THE PEREKOP CANAL.—The Russian Government has begun the work of cutting the Perekop canal, the original survey for which was made many years ago. This canal is to extend across the Isthmus of Perekop, connecting the Sea of Azof with the Black Sea. It will be 74 miles long, and the present expectation is that it will be completed in 1891. As with most Russian works, the main object is military, to enable war steamers to pass from the Sea of Azof to the dockyards and forts of Odessa without circumnavigating the Crimea or passing through the dangerous straits of Kertch; but the canal also has commercial importance. The bulk of the trade from the Don river and a great deal of that from the Upper Volga goes to Odessa, and the new canal will very much shorten the voyage for all the vessels engaged in this business, besides securing the further advantage that the grain barges employed on the Don will be enabled to carry their loads directly to Odessa without transshipment, the frequent storms on the Black Sea now making it necessary to transfer the loads of these barges to sea-going vessels at present. The canal presents no special engineering difficulties.

EIFFEL'S BIG TOWER is still progressing skyward, and already rivals in height the ancient Babel. The enormous mass of iron which the constructors have already piled up against the clouds is the amazement of everybody. When you stand at the base of the gigantic monument and look up to the skies through a colossal spider's web of red metal, the whole thing strikes you as being one of the most daring attempts since the biblical days when the real Babel was planned. Pessimistic people are predicting a fate for the new tower akin to that which befell the old one, but M. Eiffel is cheerfully sanguine, and his motto is evidently "Excelsior." It is gratifying to be able to state that the finance committee of the exhibition has in the meantime voted funds for the erection of a theater to be called the Folies Parisiennes. It will be managed by the amusing M. Danhray of the Palais Royal. This looks both like business and pleasure. Some enterprising person ought to improve upon this by constructing a pleasant garden in or near the Champ de Mars to replace—if only during the exhibition—the doomed Jardin de Paris.

THE GREAT CANALS OF THE WORLD.—The Imperial canal of China is over 1000 miles long. In the year 1861 was completed the greatest undertaking of the kind on the European continent, the Canal of Languedoc, or the Canal du Midi, to connect the Atlantic with the Mediterranean; its length is 148 miles, it has more than 100 locks and about 50 aqueducts, and its highest part is no less than 600 feet above the sea; it is navigable for vessels of upward of 100 tons. The largest ship canal in Europe is the great North Holland canal, completed in 1825—125 feet wide at the water surface, 31 feet wide at the bottom, and has a depth of 20 feet; it extends from Amsterdam to the Helder, 51 miles. The Caledonia canal, in Scotland, has a total length of 60 miles, including 3 lakes. The Suez canal is 88 miles long, of which 66 miles are actual canal. The Erie canal is 350½ miles long; the Ohio canal, Cleveland to Portsmouth, 332; the Miami and Erie, Cincinnati to Toledo, 291; the Wabash and Erie, Evansville to the Ohio line, 374.

THE LONGEST RAILROAD TANGENT.—The new Argentine-Pacific railroad, from Buenos Ayres to the foot of the Andes, has on it what is probably the longest tangent in the world. It is 211 miles without a curve. It is also a remarkable fact that in this distance there is not a single bridge and no opening larger than an ordinary culvert. The level nature of the country will be appreciated from the statement of the further fact that on the 211 miles there is no cut greater than 1 m. in depth and no fill of a height exceeding 1 m. The country, in fact, seems to be almost an ideal one for railroad construction. There are some drawbacks, however, one being that there is almost an entire absence of wood on the plain across which the western end of the road is located. This has led to the extensive use of metallic ties, which will be used on nearly the entire road. Work has already been begun on the mountain section of the road, which is to cross the Andes and unite with the Chilean line.

NEW AND IMPORTANT USE FOR DYNAMITE.—M. Bonnetoud, a French engineer, employs the explosive force of dynamite to drive out, for a brief period, the water from portions of wet ground in which foundations are to be made. A hole is bored in the wet ground 10 or 12 feet deep and about 1½ inches wide. By exploding cartridges of dynamite in this hole the water is driven far out beyond the sides of the yard-wide cavity which is produced, and does not reappear till after half an hour at least. The workmen then have time to clear the cavity and introduce quickly setting concrete.

THE CHICAGO RIVER SET ON FIRE.—A small boy did it. He threw a lighted match into the river near the stockyard which communicated its fire to the grease covering the water, and the efforts of the fire department only succeeded in subduing the flames after several thousand dollars damage was done to the docks.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

COSMOPOLITAN.—*Ledger*, Aug. 3: Last Monday we paid a visit to this promising property, on Dry creek, about 1½ miles from Plymouth. It has been operated for about a year past, by a company of Massachusetts capitalists. The Cosmopolitan Co. are bending their energies toward proving whether they have a mine or not. So far the prospecting operations have realized the most sanguine expectations. The shaft is 375 feet deep on the incline. The shaft is in a slaty formation, with small stringers of quartz running through it. Sinking is progressing at an average of two feet per day, working three shifts. It is probable that the large ore bodies met with in the many drifts will come together at a greater depth, forming one compact ore chimney of grand proportions. It is the intention of the company to sink to a depth of 550 feet, and run drifts at that depth in various directions.

MISCELLANEOUS.—The Zeile mill is running about 20 stamps. A number of men have been laid off while sinking operations are prosecuted. They are now putting in a tank at the 800 level, and when that is finished they will proceed to sinking. It is intended to go down 200 feet. It is reported that it ore is found to exist at this increased depth as in the levels above, important improvements will be made to facilitate the working of the mine, which will probably include the sinking of a new shaft. The Keystone mine at Amador City is turning out better than for some time past. The bullion output of last month was the heaviest for many months.

SUTTER CREEK.—*Cor. Amador Ledger*, Aug. 3: Sinking the shaft of the North Star is completed, it having attained a depth of 600 feet. There now remains a sump of 30 feet to be sunk, when crosscutting will be in order. It is likely that drifting will be carried on to a distance of several hundred feet each way, before the company will be satisfied as to the value of the claim. Sinking continues at the Wildman at a satisfactory rate. It is going down at an average rate of about two feet per day. S. D. R. Stewart is still working a few men on the Lincoln. They are now running an open cut to get to another dump.

EL DORADO.—The El Dorado mine, which was started up by C. B. Mayon, has come to a standstill. The roller-mill of the Bryant patent, which is owned by the Treasure-Box Co., was started on the rock, and we are told yielded excellent results during the short time it was in operation. T. Mayon has gone East, partly for the purpose of disposing of the property to capitalists there.

Calaveras.

THE MINING SITUATION.—*Calaveras Chronicle*, Aug. 4: Of late there have been few new mining ventures hereabouts worthy of note. The prospects of a short supply of water in the early part of the season, which at present are being realized, have had a tendency to discourage the commencement of operations in a number of cases. There are some heavy enterprises that promise development in the near future, but like all undertakings of magnitude they move slowly. Among these we do not include the Ilex, which ranks among the biggest mining ventures on the coast in the extent of its preparations with the encouraging outlook of a successful investment. In addition to the necessarily slow movement of enterprises involving large investments of capital, even under favorable circumstances, the season has operated as a discouragement to the commencement of actual work. In the southern portion of the county, in and about Angels' Camp, mining has been very active and with flattering results, but the scarcity of water in that section, too, is operating adversely to the interest, causing the cessation of work in some of the mines. Good reports come from quartz prospecting in the neighborhood of Sheep Ranch, besides the steady operation of the famous mine which called the town into existence. In the West Point country the principal mines are reported to be holding the even tenor of their way, with no striking developments to mention, while smaller prospects now and then show up encouraging finds. In the neighborhood of San Andreas we learn of several promising mines. In this immediate vicinity few are now active and fewer still will be working in a few weeks for want of the necessary motive-power, water.

THE EXCELSIOR CON. G. M. CO., organized and incorporated some time since, have made no move to open up their property, and will do nothing in that direction until water can be obtained. Their mine is on Tunnel ridge, and was formerly the Bonanza hydraulic claim, owned by S. S. Moser & Co. While working by the hydraulic process, what promises to be a valuable quartz vein was uncovered. Upon the discovery of the quartz vein, it was determined to follow up the prospect for quartz and if found to hold out to put the necessary works to operate in both quartz and gravel. The vein measures fully 20 feet in width, not of solid quartz, however, but consisting of a mixed formation which is easily mined and which prospects well throughout. The outlook for this enterprise is certainly flattering. The Quaker quartz mine near "the junction" has been running with encouraging results, but on account of the shortness of the water supply, we understand the mine will close to-morrow for the season. The What Cheer mine closed Friday, also, for want of water for running purposes.

TUNNEL CONTRACT.—*Mountain Echo*, Aug. 1: A contract has been let to run 200 feet of a tunnel on the London mine, owned by D. H. Jones and Jos. H. Reed, in Albany Flat district, and formerly known as the Antelope Trail claim.

CONFIDENCE.—Some of the ore recently extracted from the Confidence mine in this town assayed \$65 a ton in free gold, and the sulphurets yielded over \$1000 per ton.

UTICA.—*Angels Record*, Aug. 1: Work is being pushed rapidly at the Utica. The new hoisting works are as yet not quite finished, but will be so in the course of a few weeks.

WHITTLE.—The Whittle mine, under the management of the superintendent, Mr. Peters, is progressing rapidly and fast developing into valuable property. The Mitchell gravel mine, at Vallecito, is

progressing rapidly. Machinery has been put on and it will be in operation in a few days. There is no doubt but it will pay and infuse new life in Vallecito.

Inyo.

NEW FIND.—*Inyo Independent*, Aug. 4: Henry Galvin is taking out ore right along from his recent find near Independence station. The ledge is over 60 feet wide and contains several veins of lead ore that appear to be converging to a central ore body. Henry may find another Cerro Gordo in his claim.

DEFIANCE.—A body of ore was struck in the Defiance mine at Darwin some days ago. The extent of the body is not yet known.

Napa.

THE FIRST SILVER BRICK.—*Napa Register*, Aug. 3: There is an exhibition at Wells, Fargo & Co.'s express office in this city a Napa production that is calculated to convince the heretofore incredulous. It is thus described in the note that accompanies it: "This is the first silver bar taken from the first cleanup of the first pan in the mill of the Palisade mines. Not weighed or assayed. Probable value, \$1000." The Palisade has often been referred to in these columns. It is located a few miles above Calistoga, at the foot of Mt. St. Helena, and is the property of R. F. Grigsby and J. Johnson. No fuss has been made about the rich bodies of ore there uncovered, but for several years work has been going steadily forward and large sums of money have been expended on the development of the mine. A mill has been recently erected, and it is now operating daytime upon low-grade ore—the poorest of the mine—that yields about \$30 to the ton. When they get this mill to running day and night on the richer grades, plenty of which is on hand, then look out! There will be excitement at the head of Napa valley, and the days of '49 will have come again. The first brick, above referred to, was this morning put on the scales and it weighed 63 lbs. It is good to look upon.

Nevada.

GRAVEL AND QUARTZ.—*Cor. North San Juan Times*, Aug. 4: The old Manzanita, or American Hill, gravel lead is receiving more attention at present than has been accorded it for a number of years, in spite of the millions that have been abstracted from it. On the north side of Sugar Loaf ridge, near Monroe's vineyard, Ellison & Tremain are pushing in a tunnel for this channel. They have not worked in far enough to strike pay, but have got encouraging prospects so far as gone. Further west, and on the same side of the ridge, the Nebraska Co. is putting down a shaft near the old Nebraska incline, from which so much gold has been taken. The shaft has reached a depth of 80 feet and is now in sand. A neat little hoisting and pumping rig run by water-power removes the dirt and frees the workings from water. One hundred and seventy feet all told will reach bedrock, when, according to old miners who are acquainted with the ground, big results may be expected. Directly across, and on the south side of Sugar Loaf ridge, is located the Manzanita Co.'s claim. They have driven in a tunnel from the face of their old hydraulic diggings and obtained some very fine dirt. The Pennsylvania grounds, to the west of the above, were worked until recently by Wheeler & Bodie, who averaged about \$250 per day from a series of short tunnels run into the low banks thereon. Water finally necessitated a cessation of operations, the bedrock pitching rapidly into the hill at the time work was stopped. Adjoining this claim on the west is the Mullen patented ground, the owner of which is clearing out a tunnel thereon, preparatory to prospecting. Again to the west, and adjoining, are the works of the Hirschman & Grover Co. They have run a series of tunnels into the ridge from the former hydraulic washings and are taking out good ground. Their operations are somewhat retarded by the large boulders. Nothing new in the quartz line, outside of expected resumption of work at the old Banner mine in the near future. Quite a number of companies made up of from two to six men each are steadily prospecting some of the numerous ledges hereabout.

MEADOW LAKE.—*Truckee Republican*, Aug. 4: Mr. Oakley was in town to-day and gave some more information concerning the operations at Meadow Lake. He was there a few days ago and took notes of what was going on. There are 15 men employed at the mine and mill, and some more will be put on at once. The late cleanup was the result of a five-days' run, and 30 tons of rock were worked per day. This 150 tons of ore produced \$900, or at the rate of \$6 a ton. The cost of mining and milling the same was \$2 a ton, leaving a net profit of \$4 a ton. The process used is said to be very simple and inexpensive to operate. The mill has 10 stamps; no plates are used, but the crushings are run on a large canvas with longitudinal strips of wood fastened on it. The heavier material is removed from the canvas to a large tub where amalgamation takes place. It is claimed that all the gold is saved by this means. It will be noticed that the value of the ore is not large, but it is easily extracted and can be cheaply milled. This ought to insure a good and permanent camp at Meadow Lake.

WILL ENLARGE THE MILL.—*Tidings*, Aug. 6: A meeting of the directors of the North Banner Mining Co. was held Saturday afternoon, and it was determined to remove the present five-stamp mill to just below the mouth of the lower tunnel. Five stamps will be added to the mill's complement, making ten in all. An incline from surface to the upper tunnel has been opened and men are at work pushing a "raise" from the lower to the upper tunnel. When this work is completed, in about three weeks, there will be an incline 500 feet in depth. Down this water-pipe will be laid and in the lower tunnel a Pelton wheel and other machinery for pumping and hoisting will be placed, for the ledge has gone down and must be followed. In fact, it has been followed to a depth of 35 feet below the lower tunnel—which is 400 feet from surface—by aid of a windlass.

SUCCESSFUL ELEVATOR MINING.—*Nevada Transcript*, Aug. 1: Supt. Tully of the Omega gravel mine has for some time been experimenting in working that property by the elevator process, and his efforts have been thoroughly successful. The tailings are now raised a distance of 15 feet and conveyed to a worked-out portion of the claim, and it is believed they can be raised 35 feet with equal facility. The water when it finally passes off into the river is as clear as when it leaves the storage reservoir. Mr. Tully thinks the elevator system affords a prac-

tical and complete solution of the slickens problem wherever the extra amount of water required for carrying it on can be obtained at a reasonable cost.

DIDN'T PAY.—*North San Juan Times*, Aug. 4: A gentleman from French Corral the latter part of last week told us that the drift mine heretofore being operated there by the Milton Co. was to have been shut down Saturday evening last. The reason assigned was the unprofitableness of the venture. A bedrock tunnel was being run on this claim and between 10 and 12 men found employment in the diggings.

A MINING ENTERPRISE.—*Nevada Transcript*, Aug. 5: E. O. Tompkins has secured an interest in the Norway quartz mine on the north side of Canyon creek, eight miles from Grantville. He will leave here Tuesday with a force of workmen and proceed to develop the property, which is regarded as a most valuable one.

Shasta.

DEADWOOD.—*Redding Free Press*, Aug. 4: At Deadwood last week, seven tons of rock, from the Little Gem mine, yielded \$2000 in gold. At French Gulch the Niagara Mining Company cleaned up \$22,000 last month from the Old Shafter mine. Frank Wheeler, on Kline gulch, is still finding rich rock, and is well satisfied with the results he is obtaining.

RECENTLY DISCOVERED.—Connor & Fricke, who for the past year have been engaged in mining operations on the Sacramento river, opposite Middle creek, have recently discovered a fine body of ore, six feet wide, of sky-blue quartz containing particles of coarse gold. These gentlemen have met with considerable success, and on the dump of one of their mines have ore that will average from \$10 to \$16 per ton. Mr. Fricke is now running a tunnel to tap a ledge 75 feet from the surface.

THE LITTLE NELL.—*Courier*, Aug. 4: The great success of the Lost Confidence Milling and Reduction Works on Iron Mountain has given that district a genuine and solid boom, and there is demand for property all along the line. Oliver Boyd has contracted for the disposal of the Little Nell mine to Deputy Sheriff Buckbee of Sacramento, and he and Thomas B. Everett of El Dorado county, who will superintend the mine, were in town Tuesday, on their way up to the mine, on which vigorous work will be inaugurated. The mine is regarded by practical miners and good judges of ore as being very valuable.

LOWER SPRINGS.—*Cor. Shasta Courier*, Aug. 4: Lower Springs mines are becoming more favorably known as being in one of the richest quartz-mining camps in Northern California. It is a fact that Lower Springs can boast of having the most extensive surface prospects that can be found anywhere. This district has been very rich in placers and float gold quartz. There is every reason to believe that the ledges are extremely rich in places, and in course of a short time the whole camp will be thronged with miners. These are not wild goose assertions, but based on reason and sound judgment. Our surrounding camps, such as Dog Creek, Squaw Creek and others, of course, have big advantage over our Lower Springs mines. First, they have abundance of water-power; second, they have high mountains for tunneling, but the access to our mines here at home is much better than either of the Creek mines. If we had the same advantage for working ores as some of the creek camps have, there would be hundreds of tons of ore crushed daily here at home.

Sierra.

GOOD HOPE.—*Mountain Messenger*, Aug. 4: Arrangements have been completed whereby work has again been resumed on the Good Hope tunnel. Only a few hundred feet of tunnel remain to be run to reach the ledge, tapping it a long distance below the old workings, which were near the surface. When the last work was done by Hewson, just before the mill was burned, the rock paid exceedingly well, which we know by personal observation.

MILL.—There seems a fair prospect that a quartz-mill will be built on the Montpelier (old Wheeler) claim at no distant day. The largest owner in the property was here recently and was highly pleased with the outlook. Thos. Bessler and Albert Butler are running a tunnel to tap the old Sailor ledge some 80 feet lower than the workings.

Siakiyou.

PAYING.—*Yreka Union*, Aug. 2: The Steamboat mine on McAdam's creek is paying big. Messrs. Frank Riley and J. S. Clelland have bonded the McMann mining property on Humbag. The final cleanup in Hon. R. H. Campbell's mine in Quartz valley yielded 49 pounds of dust. Mr. M. Sleeper brought to Yreka Monday 75 ounces of dust from his Klamath river claim, near Honolulu. Mr. J. M. Haskell, one of the owners of the Steamboat mine, on McAdam's creek, passed through Yreka Saturday, en route for San Francisco, with a grip-sack full of gold bars. H. B. Warren's new four-stamp custom quartz-mill, situated on the flats above Yreka, has started up and is working satisfactorily. Steam-power is used and the mill superintended by H. B. Green.

Trinity.

THE EAST FORK COUNTRY.—*Redding Free Press*, Aug. 4: In conversation with A. McGregor we gleaned some valuable information regarding the mines of Trinity. Mr. McGregor speaks in high terms of the mines of East Fork, Yellow Jacket creek and Rattlesnake district. He investigated the coal deposits at Cox Bar, which has a vein of from 6 to 10 inches. It is bituminous coal and has been tested and proved as such. The Golden Chest mine is located 31 miles northwest of Weaverville, on the East Fork. The ledge averages 1½ feet wide and the ore 75 per ton. A five-stamp mill has been located on this property, run by an 80-foot fall of 180 inches of water, turning a four-foot Pelton wheel. The North Star mine on North Fork, 8 miles from the fork, has a ledge from one to four feet wide. It is worked by a 60-foot tunnel and a 75-foot incline shaft. It has a vertical depth of 60 feet. A wagon-road one mile long leads to the mine, and a ditch half a mile long furnishes the water-power necessary to run the mill of five stamps. Seventy-five tons of ore recently averaged \$10 to the ton. The facilities for working are quite crude, and much loss is sustained by want of concentrators. A hurdy wheel with an 80-foot fall of 60 inches of water keeps the mill running in good shape. The Trinity gravel mine was located in 1857 and incorporated in 1874. It is situated four miles west of Weaverville. The depth of gravel is 500 feet and the pay channel 500

to 1000 feet long. This claim has been worked for 14 years. With 2000 inches of water \$500 is produced every 24 hours. Last year the company worked 369 hours and took out \$8000. The McMurray & Hupp mine was located one mile southeast of Weaverville in 1853. This claim has 95 acres of a sedimentary formation, the pay being gravel not cemented. The depth of gravel is from 25 to 50 feet. They employ 15 men, and the gross product averages \$2500 per month, which can be increased with an increase of water. The Ward placer mine contains 420 acres, and the gravel bed is half a mile wide and from 200 to 400 feet in depth. It has taken 14 years to open this mine, which will not be worked out in a century. Lack of sufficient water curtails the work, but when there is plenty of this fluid the mine produces \$25 per hour. Mr. McGregor feels that there is a fine mining future for Trinity county, and, as before stated, the East Fork country claimed his special attention.

Tuolumne.

GRAVEL AND QUARTZ.—*Sonora Democrat*, Aug. 4: E. N. Cherenich acquired an interest in a lease on the Morris mine at Bald mountain and went to work Tuesday. Quartz-mills in the neighborhood of Soudsbyville have been compelled to shut down on account of the break in the big ditch. Johnny Hartvig's mine which is situated three miles south of Sonora is looking favorably again. Messrs. Edward and James Garrett and Edward Stone are sinking a new shaft higher up on the Garrett mine. The pocket taken out of the Sell mine recently amounted to about \$3000. Jackass Hill near Tuttletown is unloading its burdens of gold. No less than five or six different parties are now and have been taking out gold. Messrs. Rice and Gillis it is reported have taken out over \$10,000 in the last six months. We learn that W. Bingham and Jack Noonan are mining out at Campbell's Flat and they have very good and indeed flattering prospects. G. L. Meade has leased the "Mexican lead" at Brown's Flat. This mine a few years ago yielded several large pockets. The quartz-mills in the neighborhood of Jamestown had to shut down recently because of scarcity of water. Of course the operations in the mines will continue, but the stopping of the water is a material detriment. The triangular concentrator of J. B. Wilder at the Sonora foundry works well and satisfactorily. The Carlot's mine situated a short distance above Summersville is sending forth some good ore. Mr. Symons, the superintendent, has about 50 tons of ore out which will soon be crushed in the Soudsby mill. There appears to be a general revival of river mining all along the Stanislaus and Tuolumne rivers. Every day almost there comes evidence of renewed faith in the beds of the rivers. They have in times gone yielded millions of dollars, and their treasures are not even now exhausted. Some time last week a party of 12 men started to mine the river bar a short distance above Byrne's Ferry. From T. H. Skaggs who was in Sonora last Saturday we learned that he and his partner are doing well at their Table Mountain mine on Mormon Creek. After only five days of work he and his partner, F. McTarnahan, cleaned up 11 ounces of gold—a little over \$200. Considering that the work of drifting the gravel and working it was all done in that time, it must be admitted that the mine is rich.

NEVADA.

Washoe District.

HALE AND NORCROSS.—*Virginia Enterprise*, Aug. 2: Since last report have hoisted 2527 tons from the 600 and 700 levels, and have shipped to the Mexican mill 836 tons and to the Nevada mill 1770 tons. Average battery assays, \$30.82 per ton. The stopes throughout the mine continue to look well. Have bullion on hand and previously shipped for the month amounting to \$70,000.

GOULD AND CURRY.—*El Dorado level*: The south drift from west crosscut No. 2 has been extended 20 feet; total length, 104 feet, still showing milling ore. During the week there has been extracted from the 250 and 300 levels, and shipped to the Douglass mill, 270 tons and 1600 pounds of ore, the average battery assay being \$24.78. Shipped to San Francisco bullion of the assay value of \$3998.60; bullion on hand in assay office in Virginia, \$3104.29.

SAVAGE.—The south drift on the 400 level has been advanced 130 feet and connected with a south drift from the Gould & Curry mine on a corresponding level. This connection greatly improves the ventilation on this level. From between the 400 and 750 levels have extracted 764 tons of ore, which has been shipped to the Rock Point mill. Average battery assays, \$19.48 per ton.

SEGREGATED BELCHER.—The raise is now up 70 feet, or at a point about equal to the 1200-foot level. For 60 feet it has been in quartz yielding good assays, but has narrowed somewhat toward the top.

BELCHER.—The 500 crosscut advanced 22 feet during the week; total length, 130 feet. No change in the ground to report. The shaft has been repaired about 200 feet during the past week.

LADY WASHINGTON.—Good progress is being made in the northwest drift on the 725 level. We expect that it will cut the Keystone vein in going a farther distance of from 20 to 25 feet.

BALTIMORE.—The pumps are working well, and the usual prospecting work is being done on the 300 level. Some streaks and bunches of good ore are being encountered.

YELLOW JACKET.—Have stopped shipping ore to the Brunswick mill. The shaft of this mine is now in better condition than it ever was before since it was built.

CONFIDENCE.—We are shipping daily to the Brunswick mill for reduction 185 tons of ore, the average battery sample of which shows a value of \$25 per ton.

ANDES.—Have sunk a winze on the 240 level 51 feet and started a drift from the bottom to the west. It is in quartz with little bunches of ore here and there.

IOWA.—The work of opening the main shaft is now completed. The Pelton water-wheel has been repaired and everything is in good shape.

OCCIDENTAL.—Extracted 107 tons of ore. Shipped to the Atlanta mill 88 tons. The assay value of wagon samples is \$28.50.

CONSOLIDATED IMPERIAL.—Repairs to the main north lateral drift on the 1100 are still going on.

CHOLLAR.—On the 650 level the north raise is in ore of a fair milling grade. The face of the north

drift on the 450 level continues in low-grade quartz. Only 20 stamps are in operation at the Nevada mill, and these are running on Hale and Norcross ore.

WEST YELLOW JACKET.—Have started a raise to connect with the incline. Stringers of high-grade ore are encountered.

ALTA.—The stamps and concentrators are running steadily, and the usual amount of ore is being mined on the 825 level.

CHALLENGE CONSOLIDATED.—Repairs to the raise and general repairs throughout the mine are still going on.

EXCHEQUER.—The face of the northwest drift on the 122 level continues in quartz of favorable appearance.

CROWN POINT.—The 700 crosscut is still advancing in favorable looking ground.

Bristol District.

COPPER.—Pioche Record, Aug. 2: The second short run of the Roe Bros' furnace at Bristol ended last Monday, the result being ten tons of almost pure copper. The small furnace was at once torn down and a larger one is now in process of construction upon the same site. When completed it is hoped it may run steadily, and the success attending the two short runs already made indicates that it will. Samples of the copper produced at the first run were sent to New York and the response received was a request to forward there all their product.

Cherry Creek District.

A BONANZA IN THE STAR.—White Pine News, Aug. 4: Last week we paid a visit to Cherry creek and were pleased to note a great improvement in the mining outlook of the old camp. We visited the Star mine, which is one of the finest ore bodies we have seen in many a day. The new bonanza is on the 160-foot level on the south ledge and is seven feet wide by 40 feet in height. It is a well-defined, true fissure vein of fine quartz, carrying about one-third gold to two-thirds silver, and pitches to the east, where a large scope of unexplored ground still remains. Foreman Jack Bews thinks the ledge will run 300 feet further east. It is probable that Messrs. Keeney & Martin, who are operating the Star, will shortly increase their milling plant. The ore is free milling and the gold it contains brings the bullion up from \$1.25 to \$1.30 per ounce.

Devil's Gate District.

MINING LITIGATION SETTLED.—Virginia Enterprise, Aug. 3: Day before yesterday the owners of the Oest mine, in the Devil's Gate district, bought 400 feet of the south end of the South End Mining Co.'s claim, paying Messrs. Pollard & Lux therefor \$1600 and to George Walker \$2300. The latter parties were litigating for possession of the claim, and the Oest party bought both out. This clears every imaginary thing likely to come in conflict with the Oest location. Since Fred Oest struck pay rock in his mine, about three years ago, he has purchased and settled three different claims. By the last purchase the Oest party obtains possession of a tunnel through which they can advantageously work the north end of the Oest claim almost to the present depth of the mine without hoisting. The Hayward mine, which is on the same ledge, has by far the largest body of ore discovered in the district. It is being worked by Messrs. Hamilton, Quinn and others. The building of a ten-stamp mill by these gentlemen is contemplated. Messrs. Pollard & Lux, both old standbys of the district, have ore in their claim which they work at a profit. The above, with considerable prospecting work being done by individuals, insures the future prosperity of the Devil's Gate district, and bids fair to build the town larger than it ever was before.

Eureka District.

SILVER CONNOR COPPER ORE.—Eureka Sentinel, Aug. 4: The Silver Connor is practically a gold-iron mine, but some time ago a deposit of copper ore was discovered in it, and in order to ascertain its economic value, a sample of one ton of the ore was sent to Salt Lake. An assay of the pulp made at the Germania Smelting Works shows that it contains 34.2 per cent copper, 4.4 per cent silica, 25.2 per cent iron, 6.7 per cent zinc and 2.5 per cent sulphur. In addition it carries 2.9 ounces of silver and .050 ounces of gold to the ton. This ore, after deducting the expenses of freight and reduction, will net, in Salt Lake City, \$15.23 per ton.

Good Hope District.

NEW MINES.—Silver State, Aug. 2: Frank Burton and Mr. McMasiff have found a new mine in what is known as Good Hope district, near the old Winnemucca and Cornucopia road, which promises to be quite valuable. In running a tunnel to cut an old lead, which crops on the surface, they found a four-foot ledge, which carries two feet of ore that averages \$200 to the ton in gold and silver. They have taken out about 40 tons of ore, but have had none of it worked yet. The ore is rich in ruby silver.

Mammoth District.

ILLINOIS.—Belmont Courier, Aug. 4: Alfred Welsh continues to work the Illinois mine, Lodi, Nye county, with flattering results. He is making regular shipments of high-grade ore to the Selby Smelting Works, San Francisco, for treatment. James Graham and A. Farrington expect to cut the ledge in the Silver King soon. Lodi bids fair to become one of the most lively camps in Nye county.

San Antonio District.

NEW YEAR.—Belmont Courier, Aug. 4: Work is still progressing satisfactorily in the New Year mine, San Antonio district. The ores of this mine would leach better if they were roasted.

Seligman District.

CONCENTRATING.—Eureka Sentinel, Aug. 4: The Frue concentrator placed in the machine-shop at Seligman is in running order, and the mill which was closed down for a few days to adjust the necessary pulleys and belting was again started up last Tuesday. The Frue vanner is intended to work on the dust and slums from the dry concentrators.

Tucacora District.

DEL MONTE.—Times-Review, Aug. 3: An air shaft has been started and is down 28 feet.

NEVADA QUEEN.—The stopes over the 350-foot level are looking well and show a large amount of rich ore. The drift 100 feet above has been extended six feet and continues to open up good ore. The mill was started Monday morning and is running all right. Average assay from battery pulp \$23.22 in silver, \$24 in gold; total, \$247.22. Furnace working 93 per cent and assays from the bins show no

loss in gold. Two hundred and sixty tons of concentrating ore were extracted; average assay from car samples, \$26.39 per ton.

COMMONWEALTH.—Intermediate drift on west side of the shaft is being extended north to connect with intermediate from No. 8 upraise. This drift is showing very high-grade ore. South of the shaft on this level the east lateral has been extended 9 feet in the vein, and is showing some high-grade ore. No. 1 winze from main south drift has been sunk 21 feet, the bottom being all in the vein. The joint raise near Queen line has been extended up 16 feet, and still shows very rich ore in the top. Bullion shipped, \$20,000.

GRAND PRIZE.—The stopes above the 200-foot level are looking well and furnishing the usual amount of milling ore, nearly all of which is chloride. The 300-foot level stopes continue to yield a good grade of sulphure ore. Mill is running and working nicely.

FOUND TREASURE.—Stop: from No. 3 upraise has produced usual quantity of ore. The steam pump has been placed in position, and is now handling the water.

NORTH BELLE ISLE.—The usual quantity of ore has been extracted. The framework of the concentrating works has been erected and the building is being inclosed.

NORTH COMMONWEALTH.—North drift on the first level has been extended to feet with an increase in the flow of water.

NAVAJO.—The usual quantity and grade of ore has been extracted.

BELLE ISLE.—The stopes are yielding as usual.

Union District.

PHONOGRAPH.—Belmont Courier, Aug. 4: F. C. MacNeel and J. L. Grimes are working the Phonograph mine, near Lone, and taking out ore of a high grade, which is shipped to Soda Springs for treatment. Ores are worked there for \$15 a ton and paid for at the rate of 90 per cent of their assay value. Alfred Phillips and Neil Carmichael are chloriding in the Indianapolis mine, near Lone, and making regular shipments of high-grade ore for treatment.

ARIZONA.

MOHAVE COUNTY.—Cor. Miner, Aug. 4: The Cupel mine was supposed to have been worked out to the 200-foot level, and as the pumps did not handle the water to give the miners a chance to work, they were taken out over a year since. Last week a miner went into the old workings and began prospecting at a point where the ore gave out. The result was he drifted about six feet into the foot-wall and found a fine vein of high-grade ore. Lessee Mackenzie has put several miners at work. The C. O. D. mine has been paying as usual. The Minnesota and Connor, owned and worked by John Barry, are turning out some rich ore, and the teams have more than they can do to haul it as fast as taken out. These mines are down about 200 feet and below water level, and may be considered permanent mines. The Night Hawk is another mine that has of late come to the front. A new body of high-grade ore has been found further in the mountain. All the above-mentioned mines are paying dividends. There are 20 other mines that I saw or heard from that are doing well and making a profit over and above wages. The present prospects in mining circles are as good or better than they ever were in this county.

NOTES.—Prescott Courier, Aug. 2: J. W. McGowan, superintendent of the Senator, has a large force of men putting up a mill and other works. Jas. Shirley tells us that ex-Sheriff Henkle is digging rich ore out of his mine in Bradshaw district. It looks like business to see two mills going up out there and big dumps of rich ore. M. H. Ryan has opened the Keynote mine, Turkey Creek district, to a depth of 400 feet, and is making a shipment of ore that is worth 645 ounces silver to the ton. Owners of the rich Howard mine think they will soon run against their vein in the tunnel. Geo. Burton and others are putting in a whip at the Parker, and will soon commence raising ore. Jas. Shirley has returned from Bradshaw district, and tells of fine mines seen by him. Moody & Place, Oro Bella and other companies are getting fine ore. M. S. Taft, of Big Bug, says Van Name's mill is making plenty of bullion. C. C. Bean is in Copper Basin. The mines there are yielding very fine copper ore. Riggs & Lawler, owners of the Hillside mine, have 20 tons of ore en route to Prescott that will yield not less than \$4000.

CROWNED KING.—Journal-Miner, Aug. 2: O. F. Place, superintendent of the Crowned King Mining Company, in the Bradshaw mountains, was in town yesterday, and although not given to saying much about the properties under his control, said they were opening up finely. He has a number of openings in the mine, and all of them are in good ore. Work on the mill is progressing rapidly, and they hope to start up next month. No stoping has been done yet, all the work having been done with a view of finding what there is in the property, and Mr. Place estimates that he has enough of ground opened up now with sufficient ore in sight to keep the mill running for three years.

BRITISH COLUMBIA.

THE BEST OF THEM ALL.—The Truth, July 28: Miners who have just returned from the McMurdo district, 30 miles southeast of Donald, report it the richest and biggest thing in British Columbia. The ledges are well defined between walls of granite and slate, the ore going high in both gold and silver, and is free milling. The district is above the timber line, being about 6000 feet above the sea level, and is in the glacier belt. Snow falls to a considerable depth, and, in fact, a little falls every month in the year. Archie McMurdo made the first locations in the district. He has already sent men and tools in to commence development work, and will send in more men immediately on his return from Victoria. He compares two of the claims in appearance to the great Spanish mine at Calaveras, California. The main ledge on them is over 90 feet wide, and is crossed by seven or eight narrower ones. In fact, there were so many veins that one location was too narrow to take in the ground, and two had to be made. The ore carries gray copper, sulphurets of iron and free gold, the latter visible to the naked eye. From \$3 to \$5 a day to the man can be made by crushing the rock in a hand mortar. Mr. McMurdo cleaning up over \$100 in that way. Assays give \$50

to \$60 in gold and \$70 to \$90 in silver to the ton. Higher assays have been had, but the above is a fair average. A Calgary company has already secured a foothold in the district, and have commenced work on a claim owned by Dainard & Lowe of Golden. At present the district is reached by a trail from Hayes' landing, 25 miles up the Columbia from Golden. The distance from the landing is about 25 miles, it taking Mr. Hepburn 11 hours to make the trip out with a pack animal. Men who know the country believe the McMurdo claims are not more than six miles from the new placer diggings on Porcupine creek, and if so, it is not 30 miles from Donald. The trail from Donald to Porcupine creek will be completed next week, and immediate steps will be taken to continue it to the McMurdo district.

COLORADO.

MINING BY ELECTRICITY.—Georgetown Courier, Aug. 2: An Eastern company is furnishing mining machinery operated by electricity, consisting of a central dynamo, conducting wires, drills, etc. We were informed by a well-known Leadville mining engineer that electric plants were contemplated by some of the larger mines. That the cost of coal was so enormous that it seriously interfered with development work, as nearly all the mines were "pumping mines" and in many instances the coal bill for one month would exceed \$2000. With a large central-power plant and wires to conduct the power it would be possible to cheapen the cost of pumping. He also thought that electricity would be successfully applied to the diamond drills, and with this advance in mechanical appliances the cost of mining would be largely decreased, and explorations carried out to an extent hardly thought possible a few years ago.

DAKOTA.

SILVER BULLION.—Deadwood Pioneer, Aug. 1: The Silver Bullion, or Fargo & Huyett mine, located at the head of Strawberry gulch, unquestionably is to-day one of the best pieces of mining property in the hills. Messrs. Fargo & Huyett have been working the claim only some 8 or 9 months, but in that time have accomplished a large amount of development work. Every dollar so expended was taken from the mine, which not only yielded enough for the first stroke of the pick to pay its own way, but has also paid quite a handsome profit over and above all expenditures for development. The ore is principally galena, and assays frequently run up into the thousands, while the general average is over \$100 per ton. The mine is opened in five different places, and in the floor of each drift, leads of galena from 5 to 7 inches wide appear. The walls and floor are quartzite, and in the value of this generally barren rock is the mine remarkable. The quartzite assays frequently over \$100 per ton in silver, while samples taken from different places and carefully assayed demonstrate the general average is about \$30. As the quartzite is present in immense quantities, the resources of the mine are virtually inexhaustible. Local experts offer no satisfactory explanation of the fact that the quartzite is metalliferous, but are compelled to accept the fact. A shaft has been sunk in one of the drifts, and a tunnel to intersect it has been started from the hillside, which when finished will open the property at considerable depth. Owners have a theory that the small ore-veins intruding through the quartzite were forced up from a large body that will be found at greater depth. Acting on this, and as it pays to sink or to work the mine in any other way, developments are now progressing, and will continue to progress as rapidly as practicable.

MONTANA.

THE PEARL.—Montana Mining Review, Aug. 3: Work on the Pearl mine in Flint creek district progresses. The machinery for the new hoist has been placed in position. The contractors on the extension of the tunnel are making good progress. Sinking continues on the shaft, which has at this date attained a depth of about 45 feet below the tunnel level. The same encouraging outlook, as reported heretofore, is apparent in the character of the ore and extent of the vein. The rich wire silver galena ore body holds its own, and the vein is still wider than the shaft.

SAMPLING WORKS.—The Montana Sampling Works are now running to their full capacity—in fact beyond their capacity, for the company has lately been obliged to increase its facilities. The fact of a new sampling works starting up will increase business. The ores in the mountains of which Helena is the center, if all sampled at home, would keep three or four first-class sampling works busy the year round, more particularly so after the Helena and Great Falls smelters get into full blast.

IDAHO.

SALMON CITY.—Recorder, Aug. 3: John Long, from his mine near town, reports the arastrarunning nicely and the prospect very flattering for a good cleanup. There are 20 men employed at the Shoo Fly mine at the present time, which insures the mill to be in operation very soon. Eli Suydan has leased the Gold Block mine owned by McCormack & Co. This is the recent rich strike on Boulder Creek near the Sherman arastra. The one-stamp mill belonging to Messrs. Pollard & Kenney, at Pine creek, will be started up by Messrs. Josh Brown & Sam James as soon as the tramway is completed. They will run on ore from the Little Mike mine. Cleaning up continues on Bohannon Bar with results as satisfactory as predicted. Messrs. Potter & Barrack, the lessees, will continue next season and hope to get off much more ground. D. McNutt's splendid placer mines at Moose creek will make a large cleanup this season notwithstanding the lack of water. Jack Leopold, of Sandy creek, reports a large number of prospectors making locations in this new and promising district, and rich strikes are numerous. From the present outlook no more flattering prospects of a future camp can be found in Lemhi county.

THE KING OF THE WEST.—Wood River Times, Aug. 1: The new concentrating mill just built on the King of the West group of mines, in Smoky, was started up Tuesday. After a few trial runs and several unavoidable stoppages for the purpose of making slight alterations about the jigs, tailings sluice, etc., it was finally started yesterday noon, since which time it has run uninterruptedly. The

mill is of 60 tons daily capacity—that is to say, it can concentrate 60 tons of crude or undressed ore and thus make from 5 to 15 tons of shipping ore per day, according to the character of the rock put through. The mill, Colonel Wall informed a Times reporter, worked like a charm.

TAILINGS.—Challis Messenger, Aug. 1: The Dickens-Cutter mill is now being run on the old arastra tailings from the Charles Dickens mine. This only necessitates the use of the roasters and pans, and the stamps are hung up.

SEAFOAM DISTRICT.—The Josephus, owned by Chris Morler, A. M. Wilson and others, is being worked by six men, and is developed by a shaft and tunnel. The shaft is 30 feet deep and the tunnel 24 feet in length. A fair grade of ore, in abundance, is found in both workings. The White Goat, owned by Enos Watson, Emanuel Bell and others, is showing nicely for the amount of labor performed. Nothing but development work, thus far, has been done.

NEW MEXICO.

SILVER CITY.—Enterprise, Aug. 3: Ten men were put at work in the Deep Down Wednesday and about 40 more will soon be employed. John H. Bragaw is working ten men on the Satisfaction, leased from Phely, and is getting good returns. The Nimbres mill will start up next Monday on a big lot of good ore. About 300 tons of iron ore is shipped from here each month to smelters, the price realized being \$4 per ton on the cars. Peter Mungall, one of the most stirring of miners, has shipped a carload of zinc from Hanover gulch to St. Louis and will soon send another. Thomas B. Phely has 65 men at work at Georgetown. Most of them have been allowing the larger part of their earnings to go to pay debts incurred when they were leasing unprofitably. But nearly all are even now. The Smith & Ailman mill is running 100 tons of Golden Gilt ore. There has not been a cleanup, but the ore is believed to be yielding as well as has that of the Mountain Key.

OREGON.

PROSPECTING.—Jacksonville Times, Aug. 2: Considerable prospecting is going on in Jackson and Josephine counties. Carpenter & Co. have taken possession of P. H. Oviatt's placer mines in Josephine county. Rev. J. J. Kennedy has struck some excellent quartz in Steamboat district. Piping is still progressing at J. T. Layton's mines in Farris gulch, with excellent prospects. The Sterling Co. is still piping, having a good supply of water. They will commence cleaning up soon, however. J. W. Adams & Co., who have been engaged in placer mining in Eden precinct during the past season, are cleaning up with good prospects. Shearer & Finney of Steamboat are engaged in cleaning up. They found two good-sized nuggets recently, one of which weighed \$40 and the other \$60. Gro. Jensen and Jacob Klippel are now engaged in prospecting the Col. Irish ledge in Willow Springs precinct, from which such rich ore was recently obtained. G. C. Culy of Steamboat district was in Jacksonville yesterday for the purpose of obtaining hardware for an arastra. Abbott & Griffith, who purchased the old Fowler ledge of Richard Cook, are building. They have struck some very good quartz.

TO CRACKER CREEK.—Bedrock Democrat, Aug. 3: Main street yesterday morning presented a lively appearance, brought about by the departure of four different stages filled with passengers for the Cracker Creek mines. Not only are miners seeking the new El Dorado in the hope of striking a bonanza, but persons are going there to start different branches of trade, the forerunner to the building up of a large and prosperous town. Of those who went out yesterday, one is going to start a store, another a butcher shop, and another a hotel. It is plainly evident that the Cracker creek boom has struck far and near, and hundreds of people will arrive during the next few weeks.

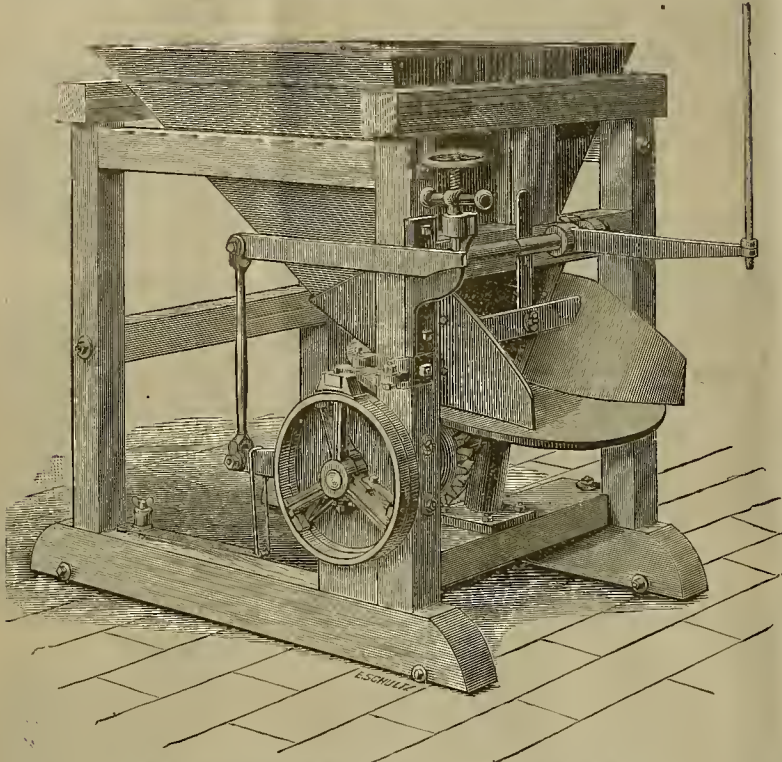
UTAH.

REVIEW.—Salt Lake Tribune, Aug. 3: The current week sees the close of the seventh month of this year, with bullion receipts (excluding all ores) as follows: January, \$327,141.43; February, \$285,687.79; March, \$283,263.98; April, \$224,019.60; May, \$385,735.14; June, \$333,899.42; July, \$319,683.26; total, \$2,159,430.62. Of course there are some operations not making current reports that are left out of the above, and the ore shipped out of Utah to be worked should mostly be added, but the amount of this in dollars and cents is not now obtainable. Taken altogether, there is a notable decrease in production from last year. The local situation is not improved. The Hanauer smelter produced well, and the ore shipments outward were again heavy. The receipts in this city for the week ending August 1st, inclusive, were to the aggregate value of \$88,349.09, of which \$50,888 was bullion and \$37,461.09 was ore. For the previous week the receipts were \$71,856 in bullion and \$37,069.83 in ore, a total of \$111,925.83. The Ontario product for the week was \$10,435.95 from ore sales, and 29,938 fine ounces of silver bullion, an approximate total of \$40,343.95. The daily output for the week was on ore sales, \$5594.09. Fine bar receipts in this city for the week were to the value of \$3450; base bullion, \$20,938. The Hanauer smelter produced bullion during the week valued at \$77,500. Ore receipts in this city for the week were \$24,061.09 by Wells, Fargo & Co., and \$12,800 by McCormick & Co.

WASHINGTON.

CLEARUM MINES.—Washington Farmer, Aug. 4: T. J. V. Clark and Jeff McDaniell have returned from the mines on the Clearum fork of the Yakima. They, together with Al Churchill and Jimmie Grieve, own the Mammoth lode, which is 70 feet wide. The ore runs 22½ per cent copper, \$44 gold and 17 ounces silver from the croppings. The owners have located two extensions and now own 4500 feet. They are running a tunnel 70 feet long to tap the lode 100 feet below the surface, and expect to ship ore. The Ida Elmore, owned by S. S. Hawkins, Jimmie Grieve and W. F. Wilcox, is being developed by a tunnel 80 feet long to cut the ledge on the 100-foot level. James Lynch has sold the Aurora for \$25,000, of which \$1000 was paid down. The purchaser is an English company, of which the principal man is Mr. McCulloch.

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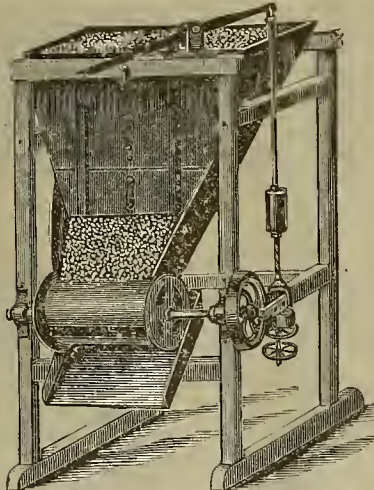
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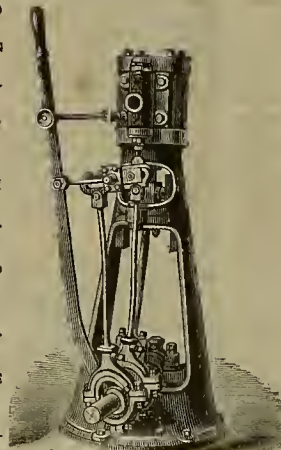
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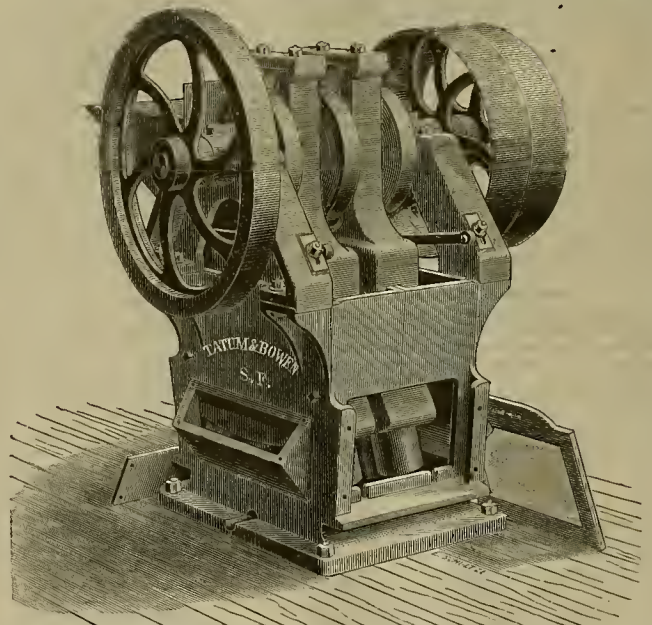
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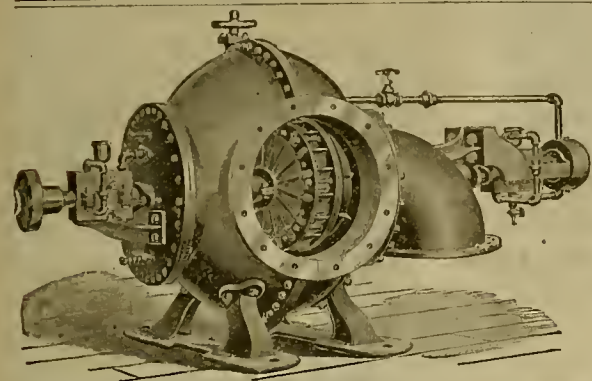
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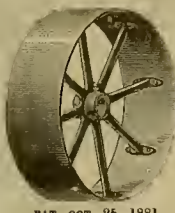
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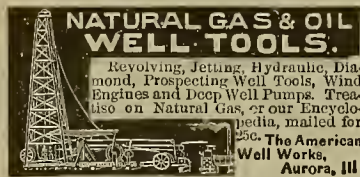
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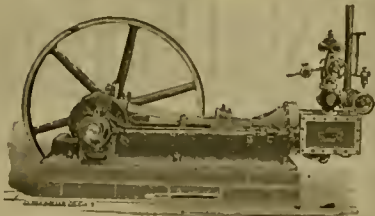
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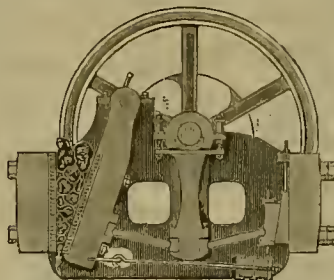
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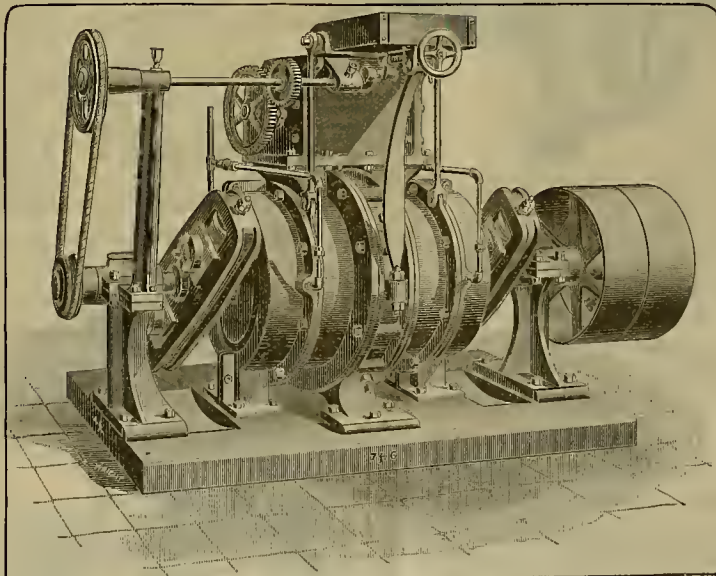
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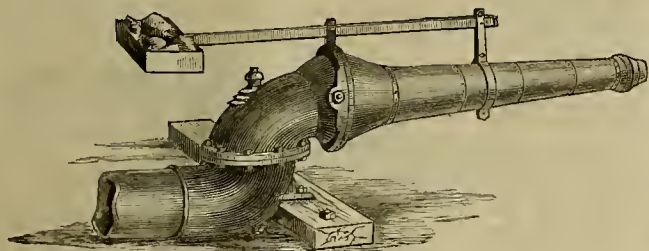
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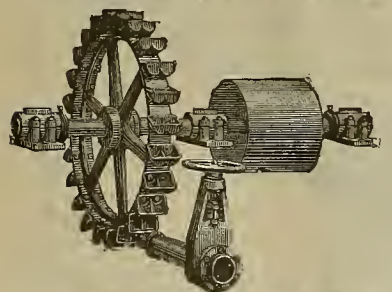
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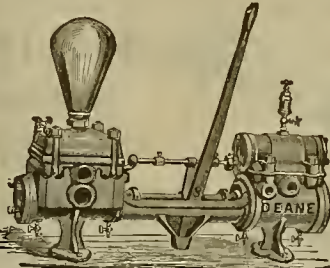
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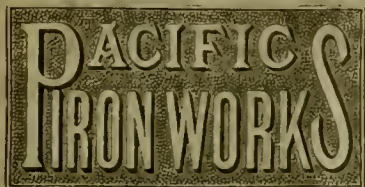
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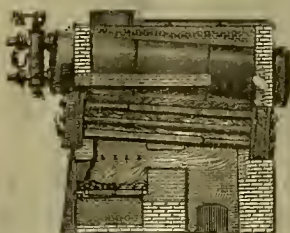
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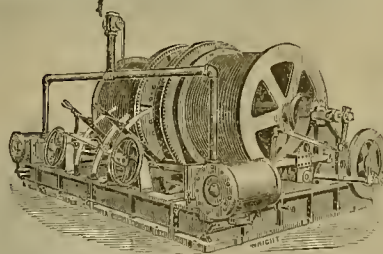
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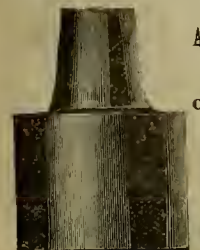
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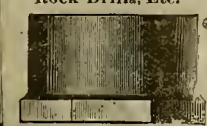
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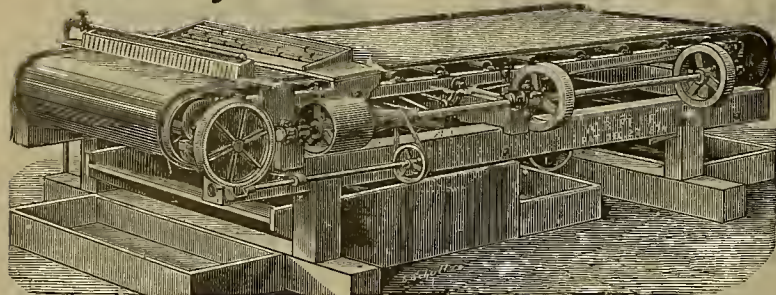
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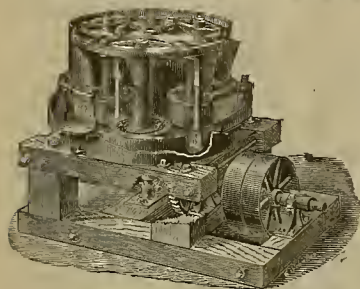
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N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

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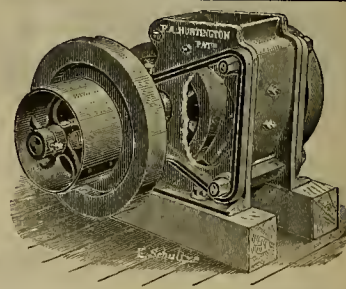
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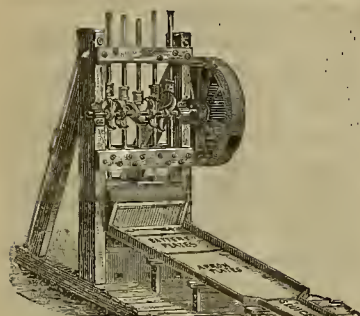
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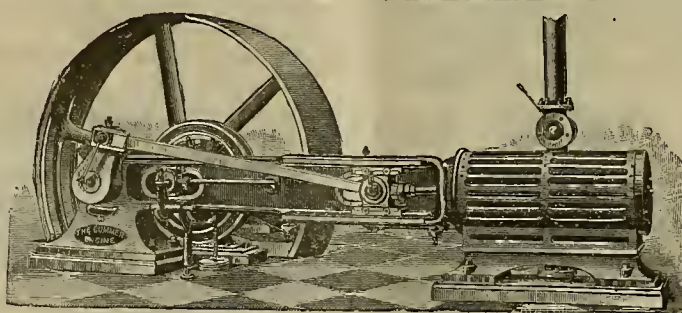
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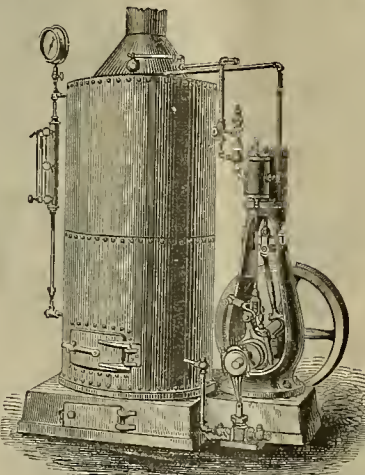
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 18, 1888.

VOLUME LVI.
Number 7.

The Principles of Blasting.

In the MINING AND SCIENTIFIC PRESS of last week we gave some sketches of mining-drill points taken from H. S. Drinker's complete work on "Tunneling, Explosive Compounds and Rock Drills," published by John Wiley & Sons of New York. This week we reproduce from the same source diagrams illustrating the principles of blasting, which will be of interest to miners:

Blasting may be defined to be the rending or tearing apart of any solid body by the pressure or shock exerted upon it from the sudden development of gas of high tension evolved on the ignition of some explosive compound placed contiguous to it. As the drilling of the holes may be said to be the dearest part of blasting, it follows that great care should be taken in setting each hole in such a position and in drilling it of such width and depth as to insure the greatest effect at the least cost. When we recall the many circumstances that may influence the effect of a shot, it is evident that the proper setting of the hole is a matter rather of judgment, based on experience, than one to be decided by empirical rules, for even were a set of rules deduced from experiments in one material, they would only apply, under similar circumstances, in the same material. The effect of a shot may be influenced, among other considerations, by: (a) The shape in which the rock is presented, the size and number of the open faces, the shape of the piece it is desired to take out, if that is an object, and, of course, primarily, the size of the cross-section of the face if it is heading work. (b) The texture of the rock, whether it is hard or easy, firm or loose, whether it is brittle or tough; thus experience gained in blasting close-grained, hard granite, trap, gneiss, etc., would not apply to limestone, sandstone, slate, etc. (c) The structure of the rock, whether it is laminated, stratified or fissured; upon its cleavage, etc., and upon whether it is massive or broken, etc. (d) The elasticity of the rock. (e) The explosive used. (f) Whether the hole is to act alone or simultaneously with or following others; in the case of simultaneous firing, the question arises of how the waves of oscillation will best act in concert. (g) The character of the fuse and tamping.

And now, supposing a shot is to be placed in any position whatever, its action will be in the line of least resistance with the lower explosives, and its greatest effect will also be in the direction of that line with the higher ones.

Let us consider the lines of least resistance in the black powder. We must assume that, on ignition, the gases developed act primarily radially; that therefore the tension of the gas extends from the point of ignition (which must be assumed to be in the center of the charge) in all directions, and that, according to the location of the charge and of the number and relation of the open faces, an undulation in the rock is produced, which, when the limit of elasticity is passed, will cause the splitting and tearing apart of the rock; and as the force developed will naturally find its vent by the shortest road, the distance between the charge and the nearest external point is called the line of least resistance.

In a perfectly homogeneous material, a regular funnel or crater would be formed, but this is, of course, only approximately attained. In actual practice, an irregular separation of the

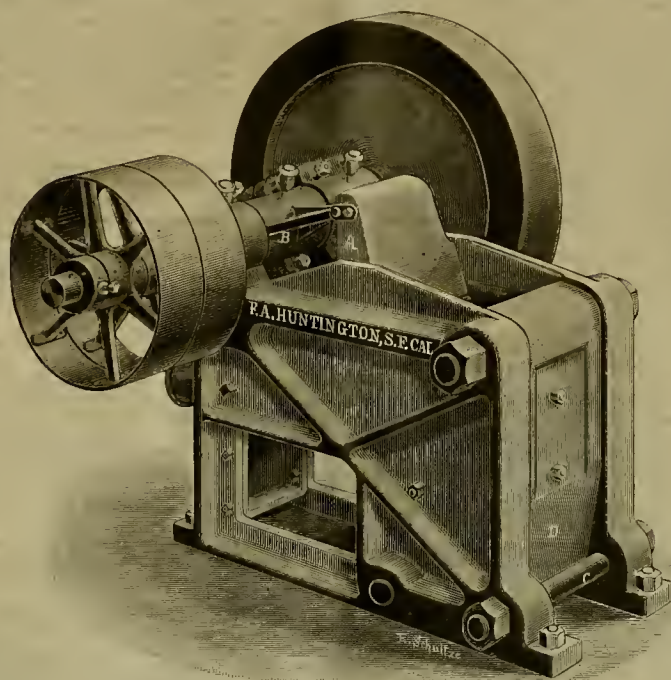
rock is effected. We accordingly have the following general rules:

1. The hole should not be located in the line of the least resistance, otherwise the tamping would simply be blown out. Be it remem-

bered this discussion is as to black powder, not nitro-glycerine.

2. Experience has established the average to be as four to three, or the length of the line of

the sphere of rupture determined by $b c$ will seldom be larger than the depth $a b$ of the hole, and it would probably be equal to $a b$ only in very easy material, when $a b$ is set at an



HUNTINGTON'S IMPROVED ROCK BREAKER.

While in Fig. 1, on account of the assumed firmness, structure, coherency, etc., of the rock, the line of least resistance formed an angle less than 45° with the face, there may be other cases (Fig. 3) where the hole should be set at a greater angle, say even 60° . In this instance, if the face $i m$ be all firm rock, it is not probable that the volume $i k m$ would be detached, but in general, the wedge $i k y n$ would be ejected. But say $o p$ represents a fissure or holing, or perhaps an open face produced by a former shot, we may then, irrespective of the line of least resistance $k l$, assume that, under favorable circumstances, the section $i k o p$ would be thrown, provided $k o$ be not larger than the depth $i k$ of the hole. From these considerations, we may deduce that,

3. Holes ought, in general, to be bored at or under an angle of 45° ; a larger angle, increasing to as much as 90° , is advisable when open faces (as $r s$ in Fig. 3) occur, and a smaller angle (Fig. 1) is advisable when the texture and structure of the rock necessitate assuming the line of the least resistance as less than three-quarters of the depth of the hole. Further, as the mass thrown breaks in the general direction of the line of least resistance, and as, in fact, this line lies in the mass ejected, or, in the extreme case of an angle of 90° , bounds the ejected mass, we must carefully observe the external shape of the rock in order to reach a maximum effect.

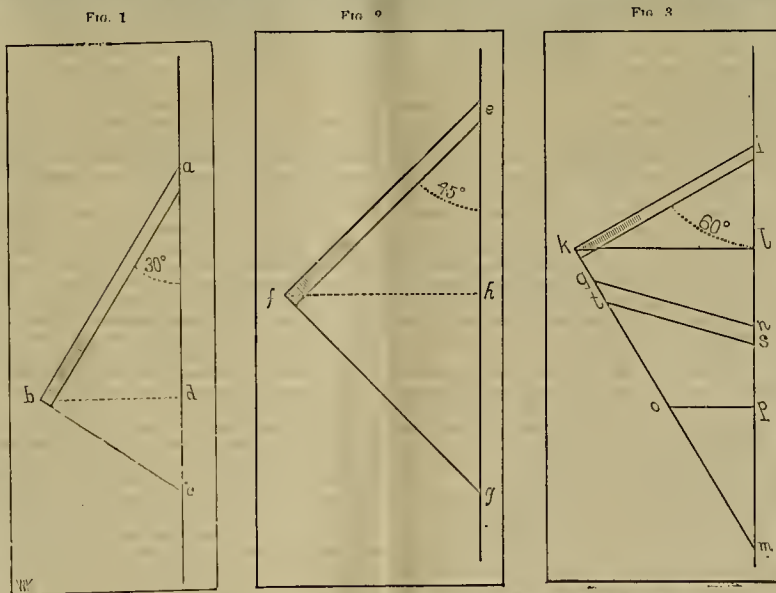
The Huntington Rock-Breaker.

Frank A. Huntington of this city, manufacturer of mining machinery, is now making an improved form of jaw-crusher, a cut of which is given on this page. The main features are strength, ease of adjustment and simplicity of construction.

The movable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt C . The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D . The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.

It is reported that advices have been received of a strike among the Australian colliers. This has been anticipated for some time. The demand on the coal mines of Australia this year to date has been unprecedentedly heavy, and the miners have been worked for all that could be got out of them. The strike will be embarrassing in several directions, especially if it should be prolonged. Australia is an important source of coal supply for California, and if this strike continues, doubtless there will be a further advance here. The receipts here for the past week were 46,555 tons, of which over 25,000 tons was coast.

SOME miners on 40 Mile creek, Yukon river, Alaska, have been making from \$8 to \$50 per day in coarse gold. The largest nugget found was \$40. The season is very short and the country a hard one to live in. Eight miners recently returned here from that region. Several of their party died there and all had the scurvy.



DIAGRAMS ILLUSTRATING PRINCIPLES OF BLASTING.

the least resistance will be three-quarters of the depth of the hole; and experience has further shown that the charge of black powder should be, on the average, about one-third of the depth of the hole, the varying limits being 0.29 to 0.45.

If in a massive rock not fissured, presenting

angle of less than 45° with the face $a c$. If we bore the hole $e f$ (Fig. 2) on an angle of 45° , we will have for the length $f h$ of the line of least resistance the expression.

$f h = e f \cos 45^\circ = e f 0.707$,
By which the greatest possible value ($\frac{2}{3}$) is reached.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Mines Around Murphys, Calaveras Co.

EDITORS PRESS:—The writer has, in previous letters, endeavored to call the attention of mining men to the advantages this section offers for profitable investments in quartz mining. Since first writing a number of mines have passed into the hands of capitalists and are now being developed and equipped for profitable working. These, however, represent but a small portion of the numerous gold mines in this vicinity. In order to give the reader an idea of the characteristics of the mines of this section, I will endeavor to give a short description of a few of the mines which at this time invite and will reward inspection.

Dussell Mines.

These mines are located immediately at the head of Nigger gulch, about a half-mile west of Murphys. Nigger gulch had proved rich, in early mining days, up to its head; that it paid well was all the miners asked, and they troubled themselves little, if at all, as to the source of supply. In October last a prospector "picking" over the gulch found coarse quartz gold running up to ounce pieces. Digging into the bank at the head of the gulch, he uncovered a mass of quartz showing a large amount of gold. A crosscut was then driven on the lead, which showed a width of 18 feet. From the quartz extracted in driving the crosscut the boys pounded out \$225. Believing the rock would pay to mill, 20 tons were crushed in the Oro Plata mill, which gave \$11.30 a ton. Adding to this the \$225 pounded out of this rock before milling, and the returns were \$21 a ton.

Stimulated by this handsome showing on an 18-foot vein, the owners contracted for a mill and started a shaft on the hanging-wall. The mill is now in operation and the last quartz taken from the bottom of the shaft was so rich that it might be called specimen rock. The vein is in slate and is of a loose shelly crystalline and granular quartz intermixed with mineralized slate. Two men extract and place upon the dump four tons in eight hours. The gold is very free-milling. By reason of the size of the vein, no timbering other than stalls is required, while the rock crushes like sand. The Union Water Company's ditch crosses the claim, while Nigger gulch affords a fall of 300 feet for water-power. If this mine was located in Alaska or Africa, it would soon become famous. As it is, the property is in a section that offers every opportunity for profitable working. With a 60-stamp mill crushing 180 tons a day, this property would soon give this section an enviable reputation.

Gladstone, Summit Blue and Sunnyside Mines.

This group comprises three locations on four parallel veins, distant about 50 feet from each other. From the Sunnyside, rock milled \$20. Summit Blue quartz was sold to the Oro Plata Co. for \$12.50 a ton, and was said to have gone \$20 to the ton. From the Gladstone a like return has been realized, while the Big Ribbon vein has not been milled but shows by assay that it will do as well. Veins are all in slate. Quartz is a fine ribbon throughout the length of the veins on the locations (3000 feet). The Sunnyside vein is 8 inches; Summit Blue, 8 to 18 inches; Gladstone, 18 to 24 inches; Big Ribbon, 1 to 4 feet. These mines are located within a half mile of Murphys, and cross the mountain diagonally, thus affording an opportunity to cut the leads by a crosscut at any desired point at a depth from 50 to 600 feet; or a drift can be run directly on the veins and the same depth attained.

The Union Water Company's ditch crosses the mines 300 to 600 feet above the base of the mountain, giving all the fall desired for water-power.

Emeralda Mines.

These mines are located on Indian creek, about three miles northwest of Murphys. A 10-stamp mill and steam-hoist, with all the necessary buildings, are erected on the mine. The group takes in 4900 feet on the vein with an additional five-acre mill-site. The shaft is now down 250 feet, with levels 100 to 300 feet long driven at each 50 feet. The vein averages two feet, though for 300 feet it is 30. The quartz is ribbon in structure, easily milled; gold free, splendid gouge to good slate walls; rock mills \$6 to \$20 per ton. There is free water for the battery, while water for power can be piped on to the mines. This property needs only to be seen to be appreciated. Not to tire the reader, I will not go into further particulars, but merely add that these mines are for sale at reasonable prices and with a climate that admits of working every day in the year.

Miners' wages here are \$2.50 a day; timber, 12½ cents a foot; logging, \$50 per M.; water for power, 10 cents an inch, and 300-foot fall can be obtained on all of these mines, thus requiring but a small amount of water in consequence of the great pressure. The railroad is 35 miles distant; freight one half cent a pound. There is a foundry and machine-shop within five miles; the roads are good. These mines are all in a settled section with good society, schools, churches, stores and hotels. To the man of capital who means business I will be

pleased to give any further information in regard to those or any other mines in this section, believing from an experience gained by a personal examination of hundreds of mines in Dakota, Colorado, New Mexico, as well as in other portions of California, that for the amount asked and natural advantages offered, no section can excel that of Murphys, Calaveras county.

Murphys, Cal.

E. H. SCHAEFFLE.

Leadville.

The Geology and Ore Deposits.

[Written for the PRESS by W. H. STORMS.]

The Leadville mining region is situated on the east side of the valley of the Arkansas river, at the head-waters of the river of the same name.

The large amphitheater-shaped basin in which the mines occur shows clearly the glacial origin of that portion of the valley. But the evidence is doubly conclusive in the glacial lakebeds and drift which underlie the city of Leadville and a considerable area outside of the city limits.

The Leadville district is the largest silver-producer from lead ores in the world, having turned out since 1878 a total in bullion and ores nearly aggregating \$150,000,000.

The geology of the district is not by any means complex, though faults are both numerous and extensive.

The base of the sedimentary series is represented by a heavy bed of a dense, firm quartzite which is referred to the Cambrian, and this is generally conceded as being correct. In places it attains a thickness of over 100 feet, but up to this writing has been found poor in ores, though some gold and a little silver has been mined from it. The quartzite rests uncomfortably on the upturned schists of Archean time, though the latter is in places displaced by porphyritic eruptives.

Overlying and conformable to the quartzite is a stratum of white magnesian limestone, and upon this rests a second stratum of quartzite (locally known as the parting quartzite). These latter are probably of Silurian age, but some refer them to the Cambrian.

Next in the ascending order is a thick, heavy bedded deposit of blue limestone (Silurian), which is as far as developments have progressed the principal ore-bearing stratum of the region.

The blue limestone is usually covered by a heavy sheet of feldspar porphyry of a white or light-gray color, which in places is interstratified with sheets of gray porphyry, which bear the appearance of having been injected into the mass from the neighboring eruptive dykes.

Over the greater portion of the area, immediately in and about Leadville, the feldspar porphyry completes the series of rock formation. The remaining localities are covered with a deposit of Weber grits, a coarse-grained sand-rock, which in places is deserving the name of conglomerate. The thickness of this deposit is variable.

Over the entire region is spread a deep quaternary deposit of glacial lake-beds and post-glacial drift. So general is this formation that an outcrop of rock is rarely found at the surface.

This fact alone has rendered prospecting in Leadville difficult, expensive and uncertain; but fortunately, owing to the unusual extent of the ore deposits, but few shafts have been sunk to contact that have failed to find ore in greater or less quantity.

The great ore bodies which made Leadville famous during the early period of her history, lie mostly in the upper portion of the blue limestone, and usually in contact with the overlying feldspar; there are, however, exceptions.

Mining experts have advanced numerous theories to account for the ore deposits, and there is still a disagreement as to the class of veins under which these ore bodies should fall. Many have called them contact veins (there certainly is a contact). Others call them contact fissures—a distinction without a difference. The finding of slickensides in some of the mines, notably the Colonel Sellers, probably led to the adoption of the latter name. It should be borne in mind that the crust of the earth is being subjected constantly to forces which produce motion, and slickensides is the result—not only in mines, but elsewhere, far removed from mineral veins.

The origin of the Leadville ore deposits is still a mooted question, though many theories have been advanced to satisfactorily account for them. While these several theories differ somewhat, all geologists agree that there is an intimate relation between the ore bodies and the eruptive rock of the region.

The opinion of S. F. Emmons is given as being one worthy of much consideration. That gentleman thinks the ore deposits were derived directly from the overlying feldspar. That the mineral solutions circulating along the bedding planes of the upper portion of the blue limestone, precipitated or deposited their mineral contents, slowly, atom by atom, replacing the limestone, which, being dissolved by the carbonic acid in the water, was carried away by the circulating waters. Mr. Emmons is also of the opinion that when the mineral solutions came in contact with a dyke of porphyry, the dyke acted as a dam, and for a time checked the flow of the mineral waters, and that portion of the ore body was in consequence much enriched. Finally, however, the waters passing through the dyke were arrested, as in an

eddy, on the other side, and it, too, became the rearing-place of large quantities of silver-bearing ores.

Charles M. Rolker, who had the advantage of a more thorough and extensive development of the mines of the district, is also of the opinion that the ore bodies derived their contents from mineral solutions circulating along the bedding planes of the lime rock, and also of the contact with the porphyry, and that the mineral solutions came from the eruptive rock of the vicinity, but not from the white porphyry. His opinion is that they came from the gray porphyry dykes, and, to give greater force to his argument, points to the fact that over considerable areas a dolomitic sand intervenes between the ore body and the feldspar. He furthermore offers as evidence that these mineral solutions came from the gray dyke porphyry, that the ore chutes follow the dykes and are richer near to them than at a distance. This is more particularly the case on Fryer hill, where are located some of the most famous mines of the district, among them being the Robert E. Lee, Little Pittsburg, Matchless, Chrysolite, Little Chief, Annie and others equally noted.

Mr. Rolker's theory is entitled to more than passing consideration, as there are other bodies of lead-silver ore where no overlying sheet of porphyry exists, and where the ore bodies have an undoubted relation to porphyry dykes in the vicinity. This is notably the case at Galena, in the Black Hills of Dakota, where the ore bodies occur in a heavy stratum of Cambrian quartzite; also at the Carbonate camp, West Virginia City, Dakota, where the ore bodies occur in Silurian limestone accompanying porphyry dykes. There are other instances similar to those at Leadville, but the existence of these counterparts and differences does not prove that no portion of the ore bodies of Leadville was derived from the overlying sheets of white porphyry.

The normal condition of the ores of Leadville was beyond question sulphide, as proven by the frequent occurrence of sulphide ores in partially decomposed masses of ore, and more particularly from the fact that the ore being taken from below the water-line of the district is, without exception, sulphide. The minerals are the sulphides of lead, iron, copper, zinc and sulphide of silver, with some native silver and a little gold.

The ores of the large and rich bodies near the surface or in the higher levels of the mines are simply the secondary products of the sulphides carbonate and sulphate of lead, with minimum and some rarer lead ores; oxides of iron, carbonates and oxides of copper, with some oxide of zinc, together with chloride of silver (in some instances in large and handsome masses), and native silver and gold, all of which have been produced by a decomposition of the sulphide minerals.

The large masses of chert found in some of the mines are doubtless due to the more siliceous condition of the limestone prior to the deposition of the ore.

During the earlier period of the history of Leadville it was thought that the ore bodies were confined exclusively to the upper portion of the blue limestone, but the development of later years has exploded this theory, as many large and rich deposits have been found in the lower portion of the limestone, which, in places, has a thickness of 300 feet. The first development in sulphide ore bodies took place in the Colonel Sellers mine, in California gulch, and subsequently similar deposits have been discovered on Carbonate hill and elsewhere. A like development of ore bodies obtains at the Carbonate camp, Dakota, in the Iron Hill and Wilkinson mines. These ore bodies occur in segregated bunches and sheets, sometimes apparently following the bedding planes of the limestone and at other times being entirely independent of it. They frequently have no apparent connection with each other, but a very close examination usually discovers a narrow seam of ochre or mineral (sometimes a mere seam of clay) which actually forms a connection between two or more bodies.

Leadville is by no means an anomaly, having many duplicates in all essential characteristics except extent and richness. In addition to the mines of Dakota above mentioned, may be added the mines at Aspen, Colorado, those of Eureka Hill, Nevada, Little Cottonwood and the Bingham and Dry Canyon mines of Utah; the mines of Sierra Majada, Mexico; and some in the North Park, Colorado, Wyoming Territory and in Idaho. Instances are numerous enough. The mines of all the sections mentioned bear a remarkable similarity to those of Leadville.

These facts are a basis from which some valuable hints may be drawn, viz.: The intimate association of limestone and porphyry or any sedimentary rock, and an eruptive rock is likely to result in a mine. Hundreds of places may be pointed out where the contact exists but where no ore body has been found, but there are no lead-silver mines in existence, to my knowledge, where these conditions do not obtain.

It is a matter of fact that nearly all large productive mines have some very evident relation to volcanic rocks in the vicinity, at least volcanic rock is there—in the neighborhood of the vein. As prominent among these are all the mines of the districts referred to above; the Ontario, of Utah, the Granite Mountain, the great veins of Butte, Montana, the Homestake, of Dakota, the world-renowned Comstock, the Silver King, of Arizona, the mines of Kingman, Arizona, the Hornsilver mine, of Utah, the Rosario, of Honduras, many of the bonanzas of Mexico and in numerous other localities. There

are good mines, it is true, where no igneous rock can be found, but these are mostly gold veins, producing a nominal amount of the precious metal.

There are several different porphyries at Leadville, the most important of which are the white or feldspar porphyry and the gray or dyke porphyry, which deserve more particular mention because of their intimate association with the ore bodies.

The feldspar at one time extended over the entire region in an immense sheet, which in some places attained a thickness of several hundred feet, though much of it has since been eroded by the scouring of glaciers, until, in a few instances, it has been removed entirely.

This porphyry is a portion of the immense eruptive mass which found vent at the head of Big Evans gulch, some 10 miles from Leadville. It doubtless occurred in the form of a great laccolite, and the sheet which covers the area of the Leadville region is probably only one of a number of such sheets which were injected between the layers of sedimentary strata.

The gray porphyry, however, seems to have been the result of local forces and is confined to a limited area (the mineral region) and has a more intimate relation to the ore bodies than the feldspar.

There is reason to believe that the ore bodies of Leadville were formed at a depth of 10,000 feet. The fact that this amount of sedimentary strata has been removed by the various processes of erosion would suggest this. The ore bodies, where found cropping at the surface, expose a considerable face, showing that they undoubtedly extended outward beyond their present limits. All the faults of the region have occurred since the deposition of the ore. There is ample proof of this in the fact that where ore bodies have been faulted their continuations have always been found to be counterparts, as regards size; moreover, fragments of the ore bodies have, in many instances, been dragged into the fault planes, and this alone is considered conclusive.

I write this lengthy letter at this time for the reason that the reports of the gentlemen who have made a thorough investigation of the region are published in volumes and papers which do not reach the prospector, and but few (comparatively speaking) mining men have ever had an opportunity of seeing them. I have endeavored to avoid technical terms, that all may understand the peculiar conditions under which lead-silver ores usually occur in sedimentary rocks, and it may be the means of directing attention to some valuable mines as yet undiscovered, and whose existence is entirely unsuspected.

Precious Metal Production.

The Director of the Mint has submitted to Congress a report on the production of the precious metals in the United States during the year 1887. The product of gold amounted to 1,596,500 fine ounces, of the value of \$33,000,000. The product of silver amounted to 41,269,240 fine ounces, of commercial value about \$40,450,000, and of the coin value of \$53,357,000. The gold product fell off from that of the preceding year, when it was \$35,000,000. The product of silver increased over that of the preceding year, when at coining value it was \$51,000,000. The product was contributed by States and Territories as follows, in coining values:

	Gold.	Silver	Total
Alaska.....	\$ 675,000	\$ 300	\$ 675,300
Arizona.....	830,000	3,800,000	4,630,000
California.....	13,400,000	1,500,000	14,900,000
Colorado.....	4,000,000	15,000,000	19,000,000
Dakota.....	2,400,000	40,000	2,440,000
Georgia.....	15,000	500	15,500
Idaho.....	1,900,000	4,000,000	5,900,000
Montana.....	5,230,000	15,500,000	20,730,000
Nevada.....	2,500,000	4,500,000	7,000,000
New Mexico.....	600,000	2,300,000	2,900,000
N. Carolina.....	225,000	5,000	230,000
Oregon.....	900,000	10,000	910,000
S. Carolina.....	50,000	500	50,500
Utah.....	220,000	7,000,000	7,220,000
Washington.....	150,000	100,000	250,000
Texas.....	250,000	250,000	500,000
Miscellaneous.....	3,000	2,500	5,500
Totals.....	\$33,003,000	\$53,408,500	\$86,411,500

The value of the gold deposited at the mints was \$84,667,712, of which \$32,444,067 was of domestic production, and \$39,092,051 consisted of foreign gold bullion and coin. The deposits and purchases of silver at mints amounted, at coining rate, to \$4,947,792. The imports of gold into the United States amounted to \$44,889,299. The imports of silver bullion and coin were \$16,772,614, nearly all of which was from Mexico. Silver ore were also imported, principally from Mexico, of the value of \$4,242,135. The director estimates the total metallic stock in the United States on the 1st of June, 1888, to have been: gold coin, \$592,129,702; gold bullion in the mints, \$114,710,817; total, gold, \$716,840,519; silver dollars, \$297,099,790; subsidiary coin, \$76,400,842; silver bullion in the mints, \$10,154,905; total, silver, \$333,655,537; total, gold and silver, \$1,050,496,056. An inquiry as to the value of the gold and silver used in the industrial arts in the United States during the year 1887, shows a consumption of gold of \$11,672,606, and of silver, \$5,241,998. The price of silver varied considerably during the year, the average being 98 cents per fine ounce. The amount of silver purchased for the silver dollar coinage was 24,797,279 ounces, costing \$24,221,257, the average cost to the Government being \$0.9768 per fine ounce.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

B.—Description and Cost.

1. Sodium Hyposulphite is packed in barrels of two sizes, one containing about 112 pounds and the other 550 to 600 pounds. It does not decompose in contact with the atmosphere. If imported in large lots from Europe, it costs in New York 1.5 cents per pound. If bought from dealers, the price asked is 2½ cents per pound in New York, 2.5 per pound in St. Louis and three cents in San Francisco.

2. Caustic Soda.—Only a high grade should be ordered, of 70 to 77 per cent, on account of freight charges. It is imported principally from England put up in sheet-iron drums, holding about 430 to 700 pounds, usually 640. It should not be left exposed to the air more than a day or two after being broken up, especially in hot weather, as it gradually decomposes on the surface, owing to absorption of carbonic acid. The price in New York is 2.425 cents per pound for 80 per cent. Hence a 74 per cent caustic soda would cost three cents per pound.

3. Sodium Carbonate.—Although any carbonate of soda can be used, the bicarbonate is less suitable than soda ash, on account of cost and for other reasons. It is most economical to buy the form of soda ash known as "pure alkali" of 88 per cent made by the Solvay or ammonia process. It is made in this country at Syracuse, New York, and costs 1.4 cents per pound at the works. This alkali, in the form of a white powder, is so pure that it contains 98.7 per cent of sodium carbonate, the remainder being principally sodium chloride and sulphate, and 0.25 per cent moisture. On account of the entire absence of the sodium sulphide and caustic soda (which are always formed in the ordinary soda ash), the solution for the precipitation of lead does not require purification. Both caustic soda and soda ash may be purchased of Wing & Evans, New York City.

4. Copper Sulphate or Blue Stone.—Price per pound 4½ cents in New York.

5. Sulphur.—It is immaterial whether the sulphur is crude or refined, lump or flower of sulphur. The lump sulphur requires to be broken up only so that it will pass a one-inch mesh screen. The native sulphur, occurring in large quantities in Utah, Nevada and other places, is suitable. The price in New York of refined sulphur in rolls is 2½ cents per pound; flower, 22 cents; Virginia rock, 2½ cents.

6. Sulphuric acid of 66° B. is best transported in iron tanks which hold about 1700 pounds. If shipped in this way the freight is much less than in glass carboys. The cost of a sheet-iron tank is \$6.50. Price in New York per pound, 1.25 cents; in St. Louis and San Francisco, 1.75 cents. Shipped in carloads the freight, for instance, from San Francisco to New Mexico, is only 1.67 cents per pound.

c. Comparison Between Sodium Sulphide and Calcium Sulphide.—If the lead is precipitated by itself by means of soda ash, sodium sulphide, and not calcium sulphide, should be used as a precipitant for the silver. But in any case sodium sulphide is far better as a precipitant than the calcium salt, for the following reasons:

First, the precipitating power of a pound of sulphur combined with sodium is nearly three times as great as when combined with calcium. For in the preparation of sodium sulphide the mono-sulphide (Na_2S) is formed, but in making calcium sulphide sufficient sulphur must be used to form the pentasulphide CaS_5 , as the lower sulphides are practically insoluble in water, and therefore cannot be used.

Secondly, the solubility of calcium hydrate as stated in works on chemistry is such that at 100° C., 1300 parts of water dissolves only one part of the hydrate, while the same amount of water at the same temperature dissolves 2600 parts of caustic soda. The solubility of caustic soda being thus over 3000 times as great as that of lime, it is not strange that the time required in making calcium sulphide is many times that required for sodium sulphide.

Thirdly, the amount of heat required in the preparation of sodium sulphide is only 2 per cent or 3 per cent of that for calcium sulphide. This is due not only to the fact that the union between sodium and sulphur takes place almost instantly, but also because there is a great rise in temperature due to this chemical action which causes the temperature of the mass to rise far above the boiling point of water.

Fourthly, the sodium sulphide is over 20 times as strong as the strongest calcium sulphide solution which can be made—that is, a given volume of the former will precipitate 20 times as much as the same volume of the latter. Hence there is a less dilution of the stock solution during precipitation.

Fifthly, as shown not only by the formula, but in practice, the product obtained while using calcium sulphide is contaminated with over three times as much free sulphur as that obtained while using sodium sulphide. The amount of sulphur in the sulphides at Cusi and Sombrerete (using sodium sulphide) is so small that the difference in weight and value between dried and roasted sulphides is only 6 per cent, thus allowing the substitution of a mere steam drying for the roasting, during which latter operation some silver is always lost by dust and volatilization.

Sixthly, if calcium sulphide is used, the product is contaminated with calcium sulphate also

(the sulphuric acid being derived from sodium sulphate always present in the lixiviation solution), which decreases the value of both dried and roasted sulphides and increases the weight and expense for shipment and refining.

Seventhly, the extent and cost of plant required for making calcium sulphide is much greater. For instance, at Cusi, while making calcium sulphide, four iron tanks were in constant use, three of which were always boiling. For the preparation of sodium sulphide only one of these tanks was used, and for three hours only (using steam one hour), once in 2½ to three days. The above comparison illustrates also the difference in time, labor and heat required.

Eighthly, the continual use of calcium sulphide gradually converts a sodium hyposulphite solution into one of calcium hyposulphite, which has been claimed as a better solvent for gold than the former, although no one has made the statement from his own experience, or has produced any experiments or statistics. On the other hand it has been repeatedly demonstrated on the small scale, and at Cusi on the large scale, that the solvent energy of the two solutions for gold is just the same.

Ninthly, the calcium hyposulphite solution

per cent stock solution, the grade of the product was increased over 100 per cent by the use of soda ash, and the weight decreased 32 per cent, thus effecting a great decrease in express charges. As the silver in sulphides is generally paid for at the rate of 97 to 99 per cent less \$100, more or less, for treatment, and as this \$100 is 1 per cent of \$10,000, but 2 per cent of \$5000 sulphides, there is a saving of 1 per cent if the sulphides assay the former instead of the latter.

Secondly, the obtaining of the lead product pure from other metals, and in a more compact and marketable shape than as sulphide. The separation of lead by means of soda ash is so complete that not the slightest trace is left in the solution after precipitating, and the solubility of carbonate of silver, gold and copper is such that no trace of these metals is found in the lead precipitate, except silver to the extent of one two-hundredth part of 1 per cent. At the same time no other metals can be precipitated with the lead carbonate, as all the compounds of zinc, manganese, nickel, cobalt, iron, etc., which are in the least soluble in a hypsulphite solution, are perfectly soluble in the first wash-water and are removed by it. The precipitate of lead carbonate is heavy and com-

in detail further on. In general, the order for wash-waters and solutions is as follows:

a. For Raw Ore.—No first wash-water. A strong extra solution is used first, either with or without circulation, followed by the ordinary, and finally by wash-water. In rare instances, the ordinary solution is used first, followed by a strong extra, circulated, then by ordinary, and lastly by wash-water.

b. For Roasted Ore with Acid First Wash-Water.—First wash-water; ordinary solution; strong extra solution, circulated; ordinary solution; second wash-water. No exception to this rule has so far been encountered.

c. For Roasted Ore with Alkaline First Wash-Water (Simple Alkaline Ore).—First wash-water; much weak extra solution, not circulated; ordinary solution; second wash-water. This has been the invariable order so far.

d. For Alkaline Roasted Ore with Arsenical Compounds (Alkaline Arsenical Ore).—First wash-water; ordinary solution; strong extra solution, allowed to stand; ordinary solution; second wash-water.

(To be Continued.)

The Foureroyas.

We are indebted to the *California Florist*, a new monthly journal established at Santa Barbara, for the opportunity to present to our readers an engraving of a very interesting plant which has bloomed this year on the grounds of Joseph Sexton, of Goleta.

The *Foureroya* is a noble genus of plants, named in honor of M. Foureroy, a celebrated French chemist; *Nat. Or. Amaryllidaceae*. In many ways they resemble the genus *Agave*, *Aloe* and *Yucca*. Paxton describes nine varieties, most of them from South America and Mexico, but omits *F. Bedinghausi*, one of the finest.

Some confusion has existed as to the identity of *F. Longava* and *F. Bedinghausi*, owing to the mesager descriptions given in the botanical dictionaries. Both varieties have now flowered in California and proved to be entirely distinct in every way.

Two years ago *F. Longava* flowered on the grounds of Dr. Lorenzo G. Yates of Santa Barbara. The plant was brought from Central America seven or eight years previous. In foliage the plant resembles a broad, long-leaved *Yucca*. The semi-flexible leaves are of a rich green color, and form a thick-set oval cluster close to the ground. The flower stalk, which grew as rapidly as that of the *Agave*, attained the remarkable height of 40 feet. Beginning about 10 feet from the ground, long, slender, lateral branches were thrown out at short intervals, gradually decreasing in length until the summit was reached. The numerous small grayish-white flowers were soon replaced by little bulletts, which also were produced from the axis of the branchlets. Hundreds of these bulletts are now growing into fine plants in various parts of the State. Some have been laid away for two years without nourishment, and are as sound, healthy and green as of yore. The parent plant has not died, but has become more hunchy and may possibly bloom again.

F. Bedinghausi, which is now in bloom on the grounds of Joseph Sexton, though not so ornamental or long-lived as *F. Longava*, is a wonderful plant, worthy of general cultivation. It grows to a thick stalk about 14 feet high. The bluish-green, flexible leaves, which are from three to four feet long, droop gracefully as soon as they reach maturity. Several plants have previously attempted to flower, but through their inclination to follow the sun around only succeeded in twisting their heads.

The plant and flower-stalk illustrated is about 42 feet in height from the ground, and the branches, as will be seen, are drooping under the weight of myriads of yellowish-green flowers. The plant is about ten years old.

Unlike *F. Longava*, *F. Bedinghausi*'s source of perpetuation is by seed, in the producing and maturing of which this floral giant makes one grand final effort, the cost of which is death. This plant would no doubt succeed over a large extent of territory.

THE LONGEST DAY IN THE YEAR.—Old miners stoutly maintain that on the longest day in the year the air in long tunnels and deep shafts stagnates. They say that their candles can hardly be made to burn and that they find it difficult to breathe. The air appears to be dead or deficient in oxygen. They declare that this is no superstitious notion, but a curious phenomenon that has been observed by all old miners, and say that it is no new thing, as miners have known of it for hundreds of years. They assert that on that one day the earth and the atmosphere are in about the same situation as the crank of an engine that has stuck on its center.

MINERS' CABINS IN ALASKA.—Miners find no difficulty in keeping their cabins warm and comfortable by making use of Russian ovens, which are very simple to build, as they are made of stone, in the shape of a large box-stove, from three to four feet long inside, from 18 to 20 inches wide, and the same in depth, with an iron plate on top to cook on. The chimney is built of the same material. Miners who wintered here last winter and the previous winter went out every day to cut their regular firewood, and so far no severe cases of frozen limbs have occurred. Indians travel and live in brush houses all winter. They subsist chiefly on dried moose, caribou meat and fish.—*Junco Press*.



FOUREROYA BEDINGHAUSI IN BLOOM.

decomposes much quicker than sodium hypsulphite, and, as shown in actual practice, a greater addition of hypsulphite to the solution is required to maintain it at one per cent when calcium than when sodium hypsulphite solution is used. As shown in many laboratory experiments at the Ontario, the average rate of decomposition of calcium hypsulphite solution was from 5 to 13 times as great as for sodium hypsulphite. In these tests, solutions of 2, 5 and 10 per cent were exposed in soup-plates at a temperature of 65 to 70 Fah. for seven days.

Tenthly, not only is the use of calcium hypsulphite disadvantageous as just described, if a strong solution is to be maintained, and, as shown further back, more expensive in time, labor and fuel, but also the actual cost of chemicals is greater per ton of ore treated. For instance, at Cusi, the comparison between a run of 1900 tons of ore, using sodium sulphide, and 1000 tons, using calcium sulphide, showed that the expense of chemicals alone required for calcium sulphide was 34 per cent greater per ton of ore treated than for sodium sulphide. If the cost of the labor and heat required were included, the difference would be still greater. At Sombrerete the comparison was made by Mr. Watson under the most unfavorable conditions for sodium sulphide, the cost of a pound of caustic soda at that place being over 30 times as great as caustic lime, yet the result of the test showed the superiority of the sodium sulphide.

d. The Objects of the Use of Sodium Carbonate or Soda Ash as a Precipitant for Lead ore.—First, the obtaining of the precious metal product entirely free from lead, thus decreasing the weight of product and cost of transportation, and, on the other hand, increasing the grade, and, to some extent, the rate paid per ounce of silver. At the Ontario, using a 1½

per cent, occupying only about one-quarter of the bulk of the same amount of lead in the form of a sulphide. The precipitate is pure white, and can be sold as it is for about the cost of precipitation or converted into litharge by exposure to a low heat.

Thirdly, the securing of a great saving in the amount and cost of caustic soda and sulphur used per ton of ore, and the ability to use solutions of any temperature and strength, which would otherwise be impracticable on account of the greatly increased amount of sodium sulphide which would be required to precipitate the greater amount of lead dissolved. The solubility of sulphate of lead in the hypsulphite solution increases directly as the strength and temperature. For this reason, the leaching by the old process is usually done with weak cold solutions, but, if the lead is precipitated by soda ash, the amount of lead dissolved is immaterial and the solution can be used at any strength and temperature. Besides, the cost of precipitating a pound of lead by soda ash is much less than by means of sodium sulphide. At the Ontario, using a stock solution of 1½ per cent, the net saving due to the use of soda ash in chemicals alone, without taking into account the value of the carbonate of lead, was 28 cents per ton of ore treated. With stronger solutions, the saving by the use of soda ash is much greater, with a 10 per cent stock solution being about \$2.80 per ton of ore. In short, the use of soda ash in the case of most ores secures a three-fold saving, viz: in express charges, in rate paid for silver and in cost of chemicals required for precipitating.

C.—General Order of Applying the Wash-Waters and Solutions.

The order of applying the solutions is treated



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SAN FRANCISCO

Saturday Morning, Aug. 18, 1888.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Huntington's Improved Rock Breaker; Diagram Illustrating Principles of Blasting, 105. Fourcroya Bedinghaus in Bloom, 107. Charles Crocker, 109.

EDITORIALS.—The Principles of Blasting; The Huntington Rock Breaker, 105. Passing Events; Government Engineering Work; A Fair Division of Risks and Profits; Slow Mining, 108. Charles Crocker; Prof. Thomas Eggleston; The Late George J. Speck; California Machinery at Melbourne, 109.

CORRESPONDENCE.—Mines Around Murphys, Calaveras Co.; Leadville, 106.

MISCELLANEOUS.—Precious Metal Production, 106. The Russell Process; The Fourcroya, 107. Product of Comstock Mines; Working Tests by Russell Process, 111.

MECHANICAL PROGRESS.—Interesting Discussion in regard to Iron; Electroplating and Tempering; Steel vs. Wood; Substitute for Lignum Vite; Wanted; Improvement in Air Brakes, 110.

SCIENTIFIC PROGRESS.—Number of the Stars; Ancient Norwegian Horseshoes; Telegraphing by the Clouds; The New Photograph; Ancient Use of Lead; A Talking Clock; The New Comet, 110.

GOOD HEALTH.—Mental Effects of Hot Weather; For Rattlesnake Bites; Who May Treat the Sick; To Tea Drinkers; Smoking Leads to Blindness; Nourishment for Invalids; Scarlet Fever; A Remedy for Tender Feet; The Sunflower and Malaria; To Ward Off Intoxication; The Power of Habit, 111.

USEFUL INFORMATION.—An Important Use for Reindeer Hair; A Millionaire's Idea; The Sanitary Value of Pure Water; Useful Hints; How to Save Coal; An Expert Skater, 111.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 112-13.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 116.

Passing Events.

In the death of Charles Crocker this week, the Pacific Coast loses its greatest railroad-builder and one of its wealthiest men. In the building of the Central Pacific and Southern Pacific railroads, Mr. Crocker showed great skill and energy, and the rapidity with which the work was done was largely due to his personal efforts.

Washington Territory is just now attracting considerable attention from a mining point of view. Several new districts are being opened and developed.

The mining progress of Oregon is also greater than it ever has been. The Cracker creek region is quite promising, and other districts are being more vigorously worked than has been the case for years.

Boring for oil in this State has met with great success in the Southern counties. The petroleum industry here is rapidly growing.

The quartz mines of California are being developed in all directions. It begins to look now as if our quartz-mining industry was only in its infancy. Ores that a few years ago could not be worked are now treated with profit. The improvements in mining and milling are such that there is a promise of thousands of mines being worked profitably within the next few years.

It is understood that the arrangement between the French copper syndicate and the English Associated Smelters has come to an end, and that the syndicate is free to sell where and at what price it chooses, while the smelters must get their furnace material wherever they can.

Government Engineering Work.

The San Leandro Canal and Oakland Harbor.

Among the appropriations in the River and Harbor bill this year is one of \$350,000 for Oakland harbor, where nearly a million dollars has already been spent. The work already accomplished was the construction of the two parallel training-walls which form the approach to the harbor, there being a ship channel between them from the deep water of the bay to the estuary. A great deal of dredging has also been done in the harbor, of which the largest portion has been in deepening the Brooklyn basin, at the upper end, to form the approach to the canal which is to connect Oakland harbor with San Leandro bay.

The Government engineers have decided to use the appropriation of this year in commencing the canal. The area of San Leandro bay is much greater than that of Oakland harbor. The entrance to that bay is to be closed by a dam constructed in such a manner that the waters of the flood tide may enter, but on the ebb tide the water must find its way back to the main San Francisco bay and ocean, through the canal and Oakland harbor. In this way it is intended to keep the harbor at Oakland and its approaches from shoaling. The increased volume of water on the ebb tide is expected to effect a scouring action on the bottom, so that no shoaling will take place.

The appropriation will very shortly become available and then the engineers will advertise for a month for bids to do the work. There are not many contractors who will be able to undertake this work, since the dredging and excavating appliances must be large and expensive. There are several, however, who will bid on the work, among them Von Schmidt, Williams, Chaquette and a few railroad contractors.

The canal will be 500 feet long and 400 feet wide. It is to be out on a slope of 14 feet at high and 8 at low tide. The deepest cut on this line will be 24 feet. The first contract allowed will be for 4000 feet, which will bring the cut to the Fruit Vale crossing.

Last week the borings were completed along the line and the earth borings have been left for the examination of contractors. No rocks were encountered at all. The borings were made by means of common artesian apparatus, and were continued to a depth of 25 feet in each place. Part of the ground to be excavated is marshy, but most of it is solid ground. The top soil was black adobe; the next layer is a very white clay, three feet below the surface. This white clay is about two and a half feet thick. Then they found a gray sandy clay for about seven feet. Below this they struck yellow sand full of water. No blasting will be required along the line of the canal.

Part of the work will doubtless be done with steam paddies and cars, and when water is reached dredgers will be used. The approach to the canal on the Oakland side has already been dredged to a depth of eight feet at low water. There are eventually to be three draw-bridges—at High street, Fruit Vale avenue and Park street. These draw-bridges will be built of steel.

The first section of the work to be done from the approach to the Fruit Vale crossing will require the removal of about 800,000 yards of earth. Out of this 800,000 yards some 500,000 yards will have to be removed with steam paddies and cars. The earth removed will be utilized in filling in the low marsh lands nearby. The contractors themselves must provide a place for this material. Both sides of the canal will eventually be faced with stone.

Considerable dredging will have to be done in San Leandro bay, but this appropriation will by no means complete this part of the work on the harbor. The estimates for the canal, dam and bridges call for about \$500,000.

The bottom of the canal will be generally a yellow sand, with some clay, which will stand well. Temporary bridges will be put in where necessary until the digging work is completed. The general direction of the canal is S. E. and N. W., but there is a curve at the San Leandro bay end so as to make a good entrance. The canal, of course, follows the low ground.

This is the most important engineering work now being conducted by the Government on this coast. The harbor was commenced in 1874, and would have been completed long since had

money been constantly available. But our Government system of irregular appropriations works badly in this, as in other cases of river and harbor improvement. The harbor at Oakland is completely landlocked and perfectly safe at all times. So much money has already been spent that the work should be pushed to completion as rapidly as possible. This is the desire of the engineers, but they have to depend on Congress for funds, and sometimes a year or two has elapsed with no work because there was no money available.

A Fair Division of Risks and Profits.

The *Citizen*, published at Tucson, Arizona, tenders the mining claim holder of that section this bit of advice: "My friend, if you own a mine, and want to dispose of it at any reasonable price, open it up, and our word for it, if you can show a reasonable property you will not have to wait long for a buyer," with more of like purport. This is well-meant advice tendered, we fear, to very little purpose. We can readily understand how our confreres of the *Citizen* and the other millionaire capitalists of Arizona tire of aiding this impecunious and sometimes shiftless and little appreciative class of persons in opening up their claims, and would fain rid themselves of the burden. But how shall this be done, seeing the parties so admonished to hasten themselves have not the means even where they have the inclination to act on this good advice? As a rule they are barely able to perform the work required to hold their locations, let alone undertaking the work of their thorough development. They know full well what is required to put these properties into marketable shape, nor can any amount of editorial prodding increase their desire to have this done. However goaded, they cannot accomplish the impossible. As well, now that the day of miracles is past, say to the bed-ridden arise and walk, as to counsel these men to pitch in and open up their claims if they hope to sell them.

It would be more to the purpose were investors encouraged to buy these "prospects" just as they are; supposing always that they can be obtained at a price proportioned to their apparent merit. And here is where a trouble too often comes in; the claim-holder, with nothing valuable in sight, or perhaps only a scanty showing of mineral, demanding and expecting to get an extravagant price for a property lacking the important element of assured value. He is apt to be carried away with the idea that he has a mine, whereas he has only a place for a mine, and not always a good one at that. Seeing a chance to realize on his intangible and shadowy possessions, he allows his cupidity to get the better of his judgment, and so defeats what chance he might have had to effect a sale of the same, had he been less greedy and exacting.

What then is required is that the capitalist and the claim-owner should get nearer together at the start, the one showing a more just appreciation of these embryotic mines and the other hearing in mind that they are embryotic.

Let there be a proper division of labor, the would-be investor, instead of hunting after "indications" himself, buying those that have already been found, while the prospector, with his superior fitness for that sort of work, continues his search for these oft delusive signs of wealth, turning them over when found to the man of money to be exploited with the somewhat uncertain results that always attend these mining ventures. In short, the parties to this class of transactions should show a general willingness to share their hazards as well as their profits in fair proportion.

At the Red Canyon mines, Utah, a few days since, the wire rope broke, letting the loaded cars run down the slope. The rush down was terrific. Trains, coal, and a mule that was caught and killed, were all mixed in an inextricable and jammed-up mass at the bottom. Strange to relate, such a dust was raised, mixed with natural gas, that an explosion took place. Two men, Sandy Fowler and William Seggett, were killed, and the other men more or less injured. The damage was soon repaired and the working of the mine resumed.

In many of the mines of Butte, M. T., the system of payment has been changed from pay by the day to the contract system of payment per car of producing ore.

Slow Mining.

We had a conversation the other day with a mining engineer whose business caused him to travel among the mining regions, and he informs us that he hears numerous complaints about miners' work. He says that there are frequent instances where the miners receive good cash wages, but work so slowly that the contractors pay more money than they ought to in proportion to the work accomplished. In too many instances the men seem to take no interest in the work, simply thinking of the wages they are to receive.

Some mine-owners give as a reason for employing Chinese that they can count on exactly the amount these men will do in a day; that there is no disposition on their part to shirk work. While, of course, they are unable to do as much as a white man, still, while employed, they work steadily and constantly. On the other hand, white miners will go on in such a listless manner that they will only drill about four holes a day when they ought to be able to drill six or eight if industrious.

It may be stated that these remarks are based on observations made in some of the coast counties where mining is not conducted so vigorously, perhaps, as in the mountains, and where the average efficiency of the miners is not as high. Where extended mining operations are carried on the lazy men soon get weeded out, and those that do a fair day's work for a fair day's wages are the ones that get steady employment. It does not take a mining superintendent or foreman very long to "spot" a man who shirks his job or spines it out. Such people are found in all occupations, but few of these are successful at any.

Laziness is a physical attribute of some men, just as stupidity is a mental one of others. Many men are born lazy, and by a studious cultivation of their natural gifts obtain a certain distinction in that line. But such a reputation is rather detrimental to a man's material advancement in any walk of life. It is soon found out and he is not badly wanted anywhere. A general charge of laziness or slowness, however, will not "stick" in the case of California miners. As a class, they are energetic and have some pride in their work. Of course the chronic prospector, though he works hard at times, has frequent intervals of leisure and cannot be said to be as hard-working as the miner who works for wages. The latter class have plenty of competitors among their fellows, and they must "keep their end up" in the work in progress or some one in authority will soon find a way to dispense with their services. Although labor is supposed to be noble, few men do it voluntarily, whatever the theory may be. But it becomes a custom with those regularly employed and of steady habits to keep steadily at work in working hours.

The dredging-boat for mining the bed of the Carson river will soon be at work. The *Lyon County Times* says the boat is 80 feet long and 30 feet wide; the boilers are two in number and of 50-horse power each; the engine and hoists are capable of handling 50 tons at a lift. The pipes through which the material will be raised from the river-bed are 12 inches in diameter, and 600 tons is 10 hours' work for this machine. The engine is 40-horse power, and the pump capable of lifting 150,000 gallons per hour. Two large redwood tanks, eight feet in diameter, are intended as reservoirs, by means of which a steady supply of water may be had for sluicing purposes.

JOHN MACKAY has spent \$250,000 in the wire-rope system of transmission, and \$500,000 has been spent to bring water for power on the Comstock. By the expenditure of probably \$100,000 more the system of power introduced will bring ore assaying about \$2 less within the range of profitable reduction.

WHILE workmen were engaged in excavating for a sewer on Montgomery street, in this city, black sand was found, which, on being prospected, showed colors of gold. The place was about the location of the old beach of Yerba Buena cove.

FOUR six-horse teams which have been hauling coal from the mines at Slack's canyon, Monterey county, for some months have been taken off, and it is surmised that the Southern Pacific Co. will secure control of the mines and run a railroad into them.

Charles Crocker.

The death of Charles Crocker, which occurred at Monterey this week, removes from his work one of the great railway builders of the world, and one who has long been prominently identified with industrial matters on this coast. It was he who took the first contract of 18 miles on the Central Pacific railroad, and continued as superintendent of construction until the road was finished.

Although Mr. Crocker had accumulated many millions some years before his death, he began life in humble walks. He was born near Troy, N. Y., in 1822, on his father's farm, and when nine years old was a newsboy, afterward becoming a news-agent in Troy. He then went to Indiana and worked on a farm, and afterward worked as a hand in a lumber-mill. He also became an apprentice in a forge to learn the manufacture of bar iron and mined for a time in an iron mine in Marshall Co., Indiana. When the gold excitement broke out he came to California, across the plains, arriving in Sacramento in August, 1850. For some time he worked in the placer mines in El Dorado county, afterward opening a store there. When he removed to Sacramento after his experience in the mines he opened a dry-goods house, which he conducted for some ten years, selling out to devote his capital to the prosecution of work in building the Central Pacific railroad.

It was during the six years that he remained at "the front" as superintendent of construction that he achieved an enviable reputation as a railroad-builder. He showed wonderful ability in organizing forces and handling men and materials. His energy and perseverance were remarkable. The difficulties besetting the undertaking were very great. The road had to be built across a chain of mountains where the lowest pass was at 7000 feet elevation, and the desert plains beyond were scarcely less inviting. He succeeded in laying railroad track faster than it ever had been done before, and the record of one particular day, ten and a quarter miles of track, has never since been equaled. During some of the time of the building of this road Mr. Crocker personally had charge of from 10,000 to 12,000 men.

Mr. Crocker has for years held high official position in the two transcontinental lines and the branch lines on this coast. Mr. Crocker, in addition to his constant private benefactions, has contributed to many public objects and charities. He presented the money—\$31,000—for the building of the Boys and Girls' Aid Society in this city, and paid for the building of the drive to the park. At the time one of his buildings here was burned and two firemen lost their lives, he sent \$5000 to their families. He joined with Governor Stanford in presenting the California Academy of Sciences the Ward Natural History Collection. To the same institution he presented \$20,000 as a fund the interest of which should be spent in giving employment to such persons as have, by their devotion to scientific pursuits, incapacitated themselves from active business life. The fund has already been of great service to needy scientists. It is known as the "Crocker Scientific Investigation Fund."

The engraving on this page is a good portrait of Mr. Crocker, as it was made from a photograph taken not long since. Mr. Crocker leaves a widow, three sons and a daughter. One of the sons is third vice-president of the Southern Pacific Co., another is a banker in this city, and the third is owner of a cattle ranch in Ne-

vada. The daughter is married and now lives in New York. The residence built in this city by Mr. Crocker is one of the finest on this side of the continent. He was a munificent patron of art and owned many fine paintings. Mr. Crocker was possessed of a kindly heart and took great interest in his men. He was very industrious and persevering and a man of great activity. His integrity was unquestioned. It is not too much to expect, in view of Mr. Crocker's vast wealth and his charitable disposition, that it will be found he has provided in his will for the distribution of some of his estate in public benefactions.

Prof. Thos. Egleston.

We received a visit this week from Prof.

Prof. Egleston had no opportunity to visit any of the coal mines on this coast, but he is of the opinion we should use the coals we obtain for making gas for fuel. He thinks that our industrial future depends upon the use of gas fuel, and that this question should be more carefully studied in California. In fact, he thinks that in 50 years from now no solid fuel will be used anywhere, gas alone serving the purpose.

Some of the engineering inventions of California are destined to be adopted in other countries, more especially those things connected with hydraulics and hydraulic mining. The Pelton water-wheel is, in his opinion, the most important invention made on this coast, and the wonder is that the principle had not before been discovered. Prof. Egleston hopes to gain

organization was perfected. He was a member of the Executive Committee and vice-president from the time the society was started until failing health prevented his taking an active part in the proceedings. He contributed a number of papers to the Transactions of the society, among them a paper "On Sediment-Bearing Streams," "Railroads Across the Alps," "The Goldschmidt Aneroid," and "On Earthwork," etc. He was also a member of the American Society of Civil Engineers. In the Technical Society he took a hearty interest, and was a constant attendant at its meetings as well as one of the most prominent in carrying on its affairs.

Mr. Specht was agent here for Col. Waring, and when that gentleman obtained the contract for carrying out the sewer system of San Diego, Mr. Specht went to that city as engineer in charge. The state of his health, however, prevented his continuing, and after a few months he returned to San Francisco, where he has been since. For some years he occupied offices with Col. F. Von Licht and G. F. Allardt, at 318 California street, where many civil engineers were in the habit of frequently calling. Mr. Specht was a young man of ability in his profession, and was respected by all who knew him. He was a student who kept watch of new features in his business. Several articles from his pen have appeared in the MINING AND SCIENTIFIC PRESS in the last few years. His many friends deeply regret the cutting short of his career. He leaves a widow but no children.

California Machinery at Melbourne.

California will be well represented at the great Melbourne Exhibition. In all probability the largest single exhibit will be made by a California firm, Parke & Lacy of this city. They have sent over several separate plants of mining machinery in addition to wood-working and other appliances.

The mining plant is quite complete and shows three different and distinct systems. One of these plants consists of a three-foot Huntington mill with copper plates and Frue vanners. There is a jigging plant consisting of a set of Wall rolls, three trommels, two three-compartment jigs, classifiers and slime and sand tanks. There is also a Dodge mill and concentrator; and a dry-concentrating jig of the Dodge pattern. There is a Dodge rock-breaker and Giant rock-breaker for crushing ore for these different plants, and elevators to carry the material so that the whole process of working the ore can be seen. This machinery is all arranged so as to be seen during the exhibition.

It may be stated in this connection that at the Euriovie tin mine, near Silverton, N. S. W., Parke & Lacy have placed a complete plant for treatment of tin ores. At this place the Wall rolls are doing very good work, as they also are at the famous Mt. Morgan gold mine, Queenstown.

For the United States exhibit at Melbourne Messrs. Parke & Lacy have sent over a large amount of wood-working machinery representing the following manufacturers of that class of goods:

Witherby, Rugg & Richardson of Worcester, Mass.; H. B. Smith Machine Co., Smithville, N. J.; H. L. Beach of Montrose, Pa.; Goodell & Waters, Philadelphia; Greenlee Bros. & Co., Chicago; John A. White, Concord, N. H.; S. A. Woods Machine Co., New York. This exhibit includes planers, matchers, lathes, and all sorts of wood-working machinery of the most improved patterns.

In this exhibit are also Diamond drills of the M. C. Bullock Manufacturing Co. of Chicago; Knowles' steam pumps; Ingersoll rock-drills and air-compressors; a Cyclone windmill made in this State and of a pattern now largely in use, and one of Wagner's complete roller flour-mills, made in this city.

Representing as they do so many firms, Messrs. Parke & Lacy are enabled to make a splendid exhibit of American machinery of various types and forms. Many other things have been sent from California, but this is the largest single exhibit. This firm has branch houses in Portland, Oregon, Salt Lake City, Utah, Butte, M. T., and Sydney, N. S. W. It has in this city one of the finest establishments for the exhibition and sale of machinery on this coast.

A SHIPMENT of 1000 pounds of quicksilver was made last Thursday from the Gypsy mine, in San Benito county.



THE LATE CHARLES CROCKER.

Thomas Egleston of the Columbia School of Mines, New York, who has come to San Francisco after a visit to Alaska. He has now gone on a short trip to Yosemite and from there will make a tour through the gold mines of this State. It is his intention to collect material for the second volume of his work on "Metallurgy of Silver, Gold and Mercury of the United States." Before leaving, he made a visit to the New Almaden quicksilver mines in Santa Clara county. Since his visit to these mines some 14 years ago, he finds wonderful changes; there being scarcely anything remaining of the works which were in existence at that time. Even the paper by Professor Christy, written a few years ago, does not give a complete description of the works.

While in San Francisco, Prof. Egleston visited the Pacific Rolling-Mills and the Union Iron Works. He says that he has been all over the English shipyards and in the great works at Newcastle and the Clyde, but has never seen any superior plant to that of the Union Works. He has great respect for Mr. Irving Scott's genius and executive ability.

much information during his trip among the gold mines in California, where he will examine the mines, mining machinery, etc. He hopes to establish sampling works in New York before long with all the appliances, so that students may gain some practical knowledge of milling, etc., before leaving their studies.

The Late Geo. J. Specht.

George J. Specht, a well-known civil engineer, died on Sunday last in this city. For the past year his health has been failing and for many months his mental troubles have been such as to prevent his attending to any business whatever. Mr. Specht was only 37 years of age at the time of his death. He was always an active man and in addition to his professional pursuits has written much for the press. He has contributed many articles to the German newspapers concerning engineering features of this country.

Mr. Specht was one of the founders of the Technical Society of the Pacific Coast, and in fact it was mainly due to his efforts that the

MECHANICAL PROGRESS.

Interesting Discussion in Regard to Iron.

At a recent meeting of the British Iron and Steel Institute, some very interesting discussions took place. We briefly refer to several:

Oil-Tempering.

Mr. Edmonds of the Royal Arsenal, Woolwich, announced that exhaustive experiments were then being conducted at Woolwich Arsenal as to whether oil-tempering is good or not. Mr. E. H. Carbutt, president of the Institute, had grave doubts as to the efficiency of oil-hardening. In his opinion it would in the future be a question more of annealing than of oil-tempering.

Experiments with Lead-Hardening.

Mr. Gandier stated that he was making experiments with lead-hardening, the results of which he hoped to be able to make known in a few months. He had every reason to hope that this new agency would afford an opening for the application of steel castings for guns.

Cast or Forged Steel for Guns.

At the same meeting a very interesting debate sprang up in regard to the material for field guns. Major L. Cubillo of the Spanish Artillery Ordnance Works, Trubia, in a paper entitled "Steel Castings for the Manufacture of Guns," described the experiments which he had pursued in the view of ascertaining whether, owing to the high prices of steel forgings for the manufacture of guns, it would not be possible to produce trustworthy artillery from steel castings. The conclusion at which Major Cubillo arrived he expressed thus: "While the possibility of manufacturing great flawless steel castings may not be completely established, and while a casting by tempering at different temperatures may be capable of acquiring the characteristics of steel forged and tempered, yet the latter material must be used in the construction of guns." Major Cubillo also contributed a second paper upon

Excessive Testing of Steel Guns.

Mr. B. Walker of Leeds entered a protest against the waste involved in the wholesale destruction of guns for testing purposes. In manufacturing steel forgings he advocated the use of the press instead of excessive hammering. Hydraulic Process or the Steam Hammer.

In a discussion of this matter, Mr. Walker, though the largest manufacturer of steam hammers in the world, expressed the opinion that the hydraulic press would be the machine of the future. Sir Henry Bessemer said that the hammer was subject to many disadvantages. The *vis inertiae* was an effectual barrier to the force of the blow being transmitted right through the metal. On the other hand, the slow pressure produced by the hydraulic press acted on the whole body throughout.

Mr. Adamson, the president, said they must still feel there was a good deal to do in improving processes when a manufacturer had to cut off 35 per cent of an ingot at the top and 5 per cent at the bottom before he could use it for artillery purposes. He ventured to say that that disadvantage did not exist when the hydraulic press was employed.

Scrap-Melting in Cupolas.

Mr. Fred Gautier (Paris) contributed an interesting paper upon "The Melting in Cupola Furnaces of Wrought Iron or Steel Scraps, mixed with Ferro Silicon." He remarked that the introduction of ferro-silicon, which has been watched with a good deal of interest in metallurgical circles, had provided us with a new alloy that had the power of converting a white pig into a gray one, and which was well adapted for the majority of foundry uses. The chief disadvantage appeared to be that of cost. Experiments, however, demonstrated that ordinary wrought-iron scrap, and especially of the smallest kind, which could be had at a very low price, yielded probably as good results as castings made with ordinary steel scrap. In this case gray metal was obtained of a close grain, and very sound castings which were homogeneous and absolutely without blow-holes.

As a substitute for steel castings Mr. Gautier insisted that a proper appreciation of the metal's resistance to shock—double that which was obtained from ordinary cast iron—would make it appear that there was a special market for such castings, which might, at a comparatively low price, be substitutes for the steel castings generally employed.

The Prince of Wales

Takes especial interest in improvements in this as well as all industrial enterprises, and upon motion of Mr. Daniel Adamson, he was elected an honorary member. He had previously signified that such an election would give him pleasure.

The Projected Visit of the Association to This Country.

Reference was made to the invitation received last year from two prominent American members to visit the United States this autumn, and satisfaction was expressed that upward of 300 members, or about 23 per cent of the whole, notified their intention of being present. The council possessed the most cordial assurances that the American iron and steel masters would be ready to make the postponed visit successful when the best time for an American meeting arrived.

CARE TO BE USED IN FORGING AND HARDENING STEEL.—When great care has been taken in heating a straight piece of steel, and putting it into water or other hardening compound, and it comes out crooked, the trouble is entirely in the forging. One of the most important things in the handling of iron or steel is the heating. Many think that any one with no judgment or experience can make a heater. This is a bad mistake. Long pieces of steel, such as reamers for boxing boxes for axles, are generally forged under a trip-hammer. Suppose the piece of steel to be forged is evenly heated through. The blacksmith takes the bar in one hand, and in the other his hammer, and the helper holds his sledge ready for business. The smith turns the bar back and forth, never turning it entirely over. Now the hammer and the sledge will draw out the fiber or grain of the steel faster than the anvil. The steel is unevenly forged, and very likely will not be straight, but will be made straight across the anvil. Heat this piece of steel as evenly as possible, and put it into water or other compound, and it will very likely be crooked when hardened. If a piece of steel is heated evenly, and hammered equally as many blows on all sides, and if, when crooked while forging, it is straightened by hammering, then, with care and in heating, it will generally come out straight, providing the same care has been used before it comes to the blacksmith, which is not always sure.

ELECTROPLATING AND TEMPERING.—At the second meeting of the Association of Mechanical Engineers at Nashville, the question, "To what extent does electroplating reduce the temper of highly hardened steel?" was discussed at some length, and reference was made to the peculiar and apparently causeless breakages of pieces of tempered steel. Mr. G. R. Stetson mentioned a curious instance of a small piece of steel which broke apart at night while lying in the shop and the fracture of which showed no flaw or weakness of any sort. He also advanced the theory that the molecules within the steel kept altering position and adjusting themselves for an indefinite length of time. Mr. A. K. Mansfield referred to a case of a die made of steel exploding spontaneously, and other similar instances were related. As to the effect of electroplating on the temper of steel, no members expressed any very decided views, while a number questioned whether there really was any such effect produced. Another question discussed was, "How much should be removed from the edges of punched or sheared steel plate to cut away the injured metal?" Mr. J. T. Hawkins described his experiments with a belt made of steel strips, and the plan he adopted of simply rounding the corners of the strips to prevent their cracking.

STEEL VS. WOOD.—It seems until recently to have been quite an unobserved fact that good hardwood, in proportion of weight, is much stronger than steel in resistance to breaking weight. Moreover, when an all-steel machine is brought into sharp contact with some unyielding obstacle, its frame is liable to spring, and when once sprung its usefulness is at an end. It cannot be straightened without resort to the shop for repairs. If a wood frame, it is not thus affected. If bent under a violent strain, it at once springs back to its original shape. A piece of steel one foot long and a half inch square weighs double as much as a piece of seasoned ash one foot long 1½ inches square. In other words, the steel, in proportion to bulk, is 15½ times as heavy as the wood. A steel frame of a machine which is one-fifteenth as large as a wood frame weighs exactly the same as the wood. But even with this difference in size, the wood has four times the strength. These are simple problems which every one can solve for himself.

SUBSTITUTE FOR LIGNUM VITÆ.—Lignum vitæ has long been used on the stern tubes of steam vessels and for other bearings exposed to considerable pressure. M. Stockhardt of Leipzig, however, has recently patented a process of treating ordinary soft wood so as to be fit for those purposes for which lignum vitæ has hitherto been almost exclusively used. The soft wood in question is first impregnated with oil, after which it is subjected to great pressure, causing a considerable increase in the density of the material. Thus prepared the artificial is said to have all the properties of good lignum vitæ.

WANTED.—A material for fastening knives or forks into their handles is much needed. The best cement which is used for this purpose is made by melting one pound of colophony, bought of any druggist, and eight ounces of sulphur. It may be kept in a bar or reduced to powder. Take one part of the powder and mix with iron filings, fine sand or brick dust and fill the cavity of the handle; heat the stem of the handle, then heat the stem of the knife or fork and insert. When cold it will be found to be firm in its place.

IMPROVEMENT IN AIR-BRAKES.—Eighteen years ago, when the air-brake was tried, it required 18 seconds to apply it to a train 2000 feet long. Four years later the time was reduced four seconds. Recent experiments with the air-brake on freight trains show that it can be applied to every car in a train of that length running at the rate of 40 miles an hour, and that this train can be stopped within 500 feet, or one-fourth of its own length, and all this without any serious jolting.

SCIENTIFIC PROGRESS.

Number of the Stars.

Prof. Holden of the Lick Observatory says in a late number of the *Century* that the total number of stars one can see will depend very largely upon the clearness of the atmosphere and the keenness of the eye. There are in the whole celestial sphere about 6000 stars visible to an ordinarily good eye. Of these, however, we can never see more than a fraction at any one time, because a half of the sphere is always below the horizon. If we could see a star in the horizon as easily as in the zenith, a half of the whole number, or 3000, would be visible on any clear night. But stars near the horizon are seen through so great a thickness of atmosphere as greatly to obscure their light, and only the brightest ones can there be seen. As a result of this obscuration, it is not likely that more than 2000 stars can ever be taken in at a single view by any ordinary eye.

As telescopic power is increased, we still find stars of fainter and fainter light. But the number cannot go on increasing forever in the same ratio as with the brighter magnitude, because, if it did, the whole sky would be a blaze of starlight. If telescopes with powers far exceeding our present ones were made, they would no doubt show new stars of the twentieth and twenty-first, etc., magnitudes. But it is highly probable that the number of such successive orders of stars would not increase in the same ratio as is observed in the eighth, ninth and tenth magnitudes, for example. The enormous labor of estimating the number of stars of such classes will long prevent the accumulation of statistics on this question; but this much is certain, that in special regions of the sky, which have been searchingly examined by various telescopes of successively increasing apertures, the number of new stars found is by no means in proportion to the increased instrumental power. If this is found to be true elsewhere, the conclusion may be that, after all, the stellar system can be experimentally shown to be of finite extent and to contain only a finite number of stars. In the whole sky an eye of average power will see about 6000 stars, as I have just said. With a telescope this number is greatly increased, and the most powerful telescopes of modern times will show more than 60,000,000 stars. Of this number, not one out of 100 has ever been catalogued at all. * * * In all, 314,926 stars from the first to the 9½ magnitudes are contained in the northern sky, or about 600,000 in both hemispheres. All of these can be seen with a three-inch object glass.

Ancient Norwegian Horseshoes.

A few days ago the Norwegian Government authorized the opening of a hill at Gokstad known as the "King's Bound," with a view of discovering what might be buried therein. The mound was so named from a superstition that it contained the remains of some old Norse king. The real contents, however, were a Viking ship, the bones of some old Viking king, the bones of 12 horses, saddle remnants, and a number of horseshoes. The mound in question was 170x150 feet in height. Judging from the character of the deposits, scientists place the date of deposit between 700 and 1000 A. D., during the later iron age, the first period being during the first seven centuries.

Of course, our interest is mainly with the horses and the shoes. The horses were some young and some aged, over high, smaller, apparently, than the ordinary Norwegian horse of the present day, but of the same race as the *fiord* horse. The small size of the horse may throw some light on statements of a historical nature which have heretofore been considered fabulous. For instance, the great Norse leader, who 150 years before the conquest led into France the colony that founded the Norman race, was called "Hrolf, or the walker," because he was "too tall and too stout for any horse to carry."

The horseshoes were of iron, but, says Mr. Nicolaysen, the scientist, "horseshoes proper were brought into use among the Norwegians at a much later date, nor were they known to the Romans, yet curiously enough they are everywhere seen on the Bayeux tapestry—one of the many evidences of the inventive genius of the Norman. It was the custom in those days to bury with a dead Viking his horse, dog, etc., but never before were so many animals found as at Gokstad."—*Century*.

TELEGRAPHING BY THE CLOUDS.—Admiral Sir W. Hnnt Grubbe has recently made some interesting experiments at the Cape of Good Hope on the sending of signals by means of the rays of an arc lamp reflected by the clouds. The luminous fascicle from a 100,000-candle arc lamp was directed against the clouds by means of a reflector, and interpreted according to the heliographic code. The dispatch could be read with ease at Cape Town. Other engagements were made by a vessel of the navy sent out to sea, and the signals could be read from a distance of 50 miles. This method affords a possibility of sending signals at sea, and might prove useful in favorable weather for ships in danger.—*La Lumiere Electrique*.

BEFORE THE REVOLUTION America had not declared her scientific independence. Practical necessities required the employment of astronomical observers to settle boundary disputes,

a confusion of landmarks having grown out of Old World habits. There were disputes everywhere between the colonies. In 1767 the proprietors of Maryland and Pennsylvania sent to England for two astronomers to determine their common parallel. In response to this came a former assistant to Bradley, Mason by name, and Dixon with him as assistant, the first trained observers ever employed in the United States, and whose work was the first piece of accurate measurement in this country.

The New Phonograph.

It is said that a company has purchased all the Edison and Tantor patents on the new and improved phonograph, and intend to make it a great monopoly to be used by the public only on the payment of a large price. The company purposes to imitate the Bell Telephone Company in scraping up the money of its patrons. That the phonographs will be rented, not sold, and a large interest charged on four or five times their cost.

There is no doubt but that the improved instrument is far better and more useful than the original invention of Edison; but it is extremely doubtful if it is so indispensable that the proprietors can put a fancy price upon its use as is done with the telegraph or telephone. They have no real substitutes, but the phonograph can readily be substituted in all the uses to which it may be put. Profitable monopolies on inventions cannot be sustained except when there is no available cheaper substitute. No matter how perfect the instrument may be, it commends itself more in a sentimental point of view than in any other way.

There is an idea that it will be used as a permanent record of spoken language; but it must be borne in mind that such a field of usefulness is very limited, as in these days almost all transactions of importance are evidenced by writing or printing. It would be in vain to try to substantiate the evidence of a phonograph for a written contract or agreement, or for a letter of instructions or a power of attorney; and if it is intended to use it for the impeachment of a witness, it may be said that that can now be done without it. Appearances are that it will be an interesting scientific toy, but anything further than that is as yet quite problematical. It is no doubt a very pretty scientific toy, but not, like the telephone and telegraph, an indispensable requisite in business. A reporter who recently examined one of these instruments speaks of it as follows: We saw a phonograph which was mounted upon a small table. Producing one of the tubes upon the surface of which were minute dotted lines, the operator said: "A lady was here the other day and sang to the instrument. If you will listen you can hear a reproduction of her voice." The reporter listened and heard: "If a body meet a body coming thro' the rye." Then followed a German song by the same lady. The operator said that the instrument could repeat either of the songs 5000 times if the reporter could spare the time to listen.

ANCIENT USE OF LEAD.—The ancients, like the moderns, used lead to fasten iron into stone, to give a glaze to pottery, and as a help in the manufacture of glass. Very singular were the "imprecation tablets, surreptitiously deposited in tombs, and sometimes even in the coffin of the deceased, that a curse might follow him to the other world," which seem "to have been more frequently deposited by women than by men." Vitruvius describes elaborately a vast aqueduct, the lead in which would cost to day two millions. The leaden bullets of the ancient slingers often bore an inscription in relief such as "Appear," "Show yourself," "Desist," "Take this," "Strike Rome." The Greeks were especially fond of bullets with such mottoes, and they have been found upon Marathon and many other famous fields.

A TALKING CLOCK.—Edison has invented a new dinner clock which talks; instead of striking the hour it speaks it. At dinner-time a voice issues from the clock and says, "Dinner-time," also "1 o'clock," "2 o'clock," etc., as the case may be. Another device which he is perfecting in connection with the clock is that of a female face, which he purposes to set in the face of the clock. The lips of this figure will move at the hour, the head will bow and the fictitious lady will say: "Good evening, ladies and gentlemen; it is bed-time."

THE NEW COMET.—A new comet was discovered on the 7th instant by Prof. W. R. Brooks of the Smith observatory, at Geneva, N. Y. It was found to have a slow easterly motion; is quite bright, but not visible to the naked eye. It was first seen in Ursa Major, just above the star Lambda. The discoverer says it has a large head and short tail, which last, unlike other comets, points directly toward the sun.

TELEPHONE RATES are comparatively light in Sweden. At Orobo, for instance, the subscriber pays an annual rental of but \$4 and gets the use of a telephone system extending 100 miles into the country.

THE REASON why distant objects appear closer just before rain is that the air gets damp just before rain, and damp air is more transparent than dry.

GOOD HEALTH.

Mental Effects of Hot Weather.

One of the most interesting studies bearing upon the subject of the relation of mind to matter is found in observing the effects of a high temperature upon different organizations. The nervous, sensitive, egotistic man, when the thermometer ranges among the nineties, is chiefly intent upon publishing his personal discomfort. Instead of sitting still and cooling his mind through work or genial diversion, he moves husily about telling everybody how hot it is, with gestures and ejaculations to match. He is a mental radiator, bent upon transmitting his own conditions to other minds, and without intending it is generating his own discomfort within others.

On the other hand, the man of even temperament, of cool mind, avoids all mention of physical and thermal conditions on a hot day. His purpose is to get his mind as far away from them as possible. He hears his nervous friend fling down his pen or spindle and declare that it is too hot for work. To him congenial work is the very best means of keeping his attention away from physical discomfort. One feels comparatively cool in this man's presence. He is a partial refrigerator, and transmits his own conditions.

The mere physical temperature of a man on a hot day is not the measure of discomfort. In this busy season hundreds of New England farmers toll in open fields in the hot sun in such excessive perspiration that hardly a dry thread is found on them through the day. But if one is accosted from the roadside and reminded that it is a terrible hot day, he will generally reply with true Yankee drollery that it is splendid weather for corn. The farmer's mind is on the hay and corn crops instead of the heat. His mind is kept cool by congenial labor and the promises of good crops.

What is true of man is true of beast. One of the most painful sights to a person of kind heart is to see the distress of the horses that pull the street-cars on a scorching day. These animals receive the heat of care and treatment by the companies, and their muscular strength is not overtaxed so far as mere work is concerned. A horse doing the same work on a country road would not perspire much. It is the tremendous strain upon the nerves caused by constant fear of losing their feet on the smooth paving when starting the car that chiefly induces their sweat and semi-torture. Even with a horse it is the condition of mind that largely decides its power to endure heat and work.—*Boston Globe*.

For Rattlesnake Bites.

The following recipe for the cure of rattlesnake bites is from the *New York World*. It is said to have been obtained from a Delaware Indian about the beginning of the century, and has been used by the Geer family, of Little Eddy, N. Y., for upward of 80 years past, with famous success:

Apply to the wound a poultice, one-half each of common salt and indigo, mixed with cold water, and renew every two hours. Eat freely of the leaves, or drink often of a tea made from them of a variety of the blue violet (*V. angustata*) commonly known as the "arrow-leaved" violet. If the bite be upon the leg or arm, bind the leaves in a circle around it, above and just beyond the swelling. Moistened with cold water as often as they get dry from the fever created by the poison, and renew two or three times a day.

WHO MAY TREAT THE SICK.—The Act of April 3, 1876, amended and supplemented by the Act of April 1, 1878, prohibits any person from practicing medicine who shall not first have obtained a certificate of competency from the Board of Examiners. This board consists of seven members appointed by the Medical Society of California, the Eclectic Medical Society of California and the California State Homeopathic Medical Society. A person who may be granted a license to give massage treatment is not thereby constituted a physician, nor authorized to practice medicine, and for such person to practice medicine would be to incur the penalty prescribed in the law. In a case of emergency, where immediate attention is required and medical aid is not at hand, experienced persons may do what is necessary to sustain the patient until a physician can be summoned. The intention of the law is to suppress quacks, empirics, nostrum vendors, *et id.* The penalty for a violation of the law is a fine of \$50 or imprisonment for six months, or both.

TO TEA-DRINKERS.—Whoever drinks tea let him do so in moderation. Do not take it between meals on an empty stomach. Allow it to form a part of the regular meal. Make the infusion by steeping—never by boiling. Those who are troubled with insomnia should not use it in any form. Brainworkers cannot afford to overwork on the stimulus of strong tea. The poor and scantily fed cannot afford to touch it. To dyspeptics we say, tea aggravates your trouble, and many cases are cured by disusing it. Persons troubled with constipation should not use it, either weak or strong.—*Table Talk*.

SMOKING LEADS TO BLINDNESS.—"Tobacco-smokers," says the *London Medical Mirror*, "must look to their eyes." Proofs are accumu-

lating that blindness, due to slowly progressive atrophy of the optic nerves, induced by smoking, is of frequent occurrence. In one of the volumes of the "London Hospital Reports," Mr. Jonathan Hutchinson has narrated several cases of amaurosis, the histories of which go to establish the fact that in such cases the blindness was brought on by that rapidly increasing, and, as it appears, baneful habit; and in the *Medical Times and Gazette* of a late date, the same distinguished surgeon has described another striking case of "tobacco amaurosis, ending in absolute blindness, induced in 18 months."

NOURISHMENT FOR INVALIDS.—The very best nourishment for invalids and children is the juice pressed from a steak or a mutton chop thoroughly trimmed and boiled about five minutes. The meat for this purpose should be cut at least three-quarters of an inch thick. The juice may be extracted from the meat by a lemon-squeezer or a meat-press, which comes for this purpose.

SCARLET FEVER is a specific poison which emanates from the person of the patient, and can be caused by no other means. Diphtheria is contagious, but may arise from fermenting filth, etc. Typhoid fever and Asiatic cholera are not directly communicable from person to person, but are spread by the dejects of their victims, which contaminate the water supply.

A REMEDY FOR TENDER FEET is cold water, about two quarts, two tablespoonfuls of ammonia, one tablespoonful of bay rum. Sit with the feet immersed for 10 minutes, gently throwing the water over the limbs upward to the knee. Then rub dry with a crash towel, and all the tired feeling is gone. This recipe is good for a sponge bath also.

THE SUNFLOWER AND MALARIA.—It has been stated that since the sunflower has been cultivated on certain swamps of the Potomac, malaria fever has decreased. At the month of the Scheldt, in Holland, it is stated that similar results have been observed.

TO WARD OFF INTOXICATION.—A French doctor, who has been searching for a method to ward off intoxication, recommends before drinking "an appropriate amount of food of albuminous and fatty nature," particularly cheese.

THE POWER OF HABIT.—When the nervous system has long been habituated to any habit, as of certain stimulants, and to certain circumstances at certain periods of the day, the whole system seems to expect these changes at these respective times.

USEFUL INFORMATION.

AN IMPORTANT USE FOR REINDEER-HAIR.—Life-saving apparatus of reindeer-hair has been contrived and successfully experimented with by a Norwegian engineer, it being proved that such hair is capable of supporting a weight ten times its own. Experiments were made in one case with a life-saving object which could be used on board ship as a chair, bedstead or couch, but which, in case of need, may be converted into a small boat. This apparatus was found capable of supporting three full-grown men in the water, although only intended to hear two. Another trial was with a suit made entirely of reindeer-hair, covering the entire body, except the face, in which a man floated on the water without having to make the slightest movement. It was also found wholly impossible to dive in the dress. A door-mat made of this hair was found to support a man easily, although he was dressed in full outdoor clothing. On comparing life-belts made of reindeer-hair with similar ones made of cork, it was found that the former are much lighter than the latter—a very important advantage to an exhausted drowning person when it has to be put on in the water.

A MILLIONAIRE'S IDEA.—A New York millionaire is having built a suite of rooms on top of the lofty Equitable building, over 200 feet above the sea level. The apartments are reached by a flight of gilded iron steps. The suite consists of three rooms—a parlor, dining-room and bath. All are to be carpeted and crowded with costly bric-a-brac. The little suite of rooms is provided with oval windows four feet in diameter, and will be lighted by electricity and furnished with steam-heaters for the winter months or any opportune cold wave that may break in upon the summer's heat. This superb apartment is the highest in point of elevation from the ground level of any similar suite of rooms in the world. In the hottest day in summer breezes blow in the altitudinous parlor and make a sojourn there quite as enjoyable and cooling as a siesta in the mountains under the shade trees.

THE SANITARY VALUE OF PURE WATER.—Nature's safe cure for kidney diseases—and many others—is strictly purified water. So important to health is strict purity in water that it may be reasonably presumed that one of the causes of the remarkable increase in kidney complaints is in the increasing impurity of water consequent upon our multiplying population, manufactures, etc. Says Professor Charles Mayr: "Of the thousands of chemical compounds and waste products formed in

the human system, many require pure water for their solution and elimination, and water so overloaded with salts, etc., as average well water, will not work satisfactorily. Those who have never drunk pure water do not realize what an effect such water has upon the kidneys. Its effect is better than that of acetates, nitrates, opiates or alcohol, and for people with a tendency to kidney disease or dropsy there is no better drug than pure water."

THE following are those who are engaged at present in the manufacture of olive oil in this State: Ellwood Cooper, Santa Barbara, Santa Barbara county; Frank A. Kimball, National City, San Diego county; Colonel George F. Hooper, Sonoma, Sonoma county; Edward E. Goodrich, Quito Olive Farm, San Jose, Santa Clara county; J. R. Wolfskill, Winters, Yolo county; Juan Callegos, Mission San Jose, Santa Clara county; E. W. Holmes, Riverside, San Bernardino county; General John Bidwell, Chico, Butte county; Dr. H. H. Clark, Auburn, Placer county. There are others who have large plantations, and many others who have in recent years embarked in the business and have largely planted olive trees, but as yet have made little or no olive oil, the fruit being used for pickling purposes. Many new orchards have been planted in the interior valleys. These trees are young and many have begun to bear fruit this year. There is no doubt that in a few years there will be an abundance of olive oil produced in this State, as all these plantations are doing exceedingly well and are planted on soil well adapted to their culture.

USEFUL HINTS.—It is better always, when cleaning zinc under a stove, never to wet it, but rub often with a dry, clean cloth. When necessary to wash it, avoid using soap. Do not leave any tomatoes in the bottom of a tin can, but pour into an earthen bowl till you want them. This applies to nearly all canned vegetables. A good cement for mending a stove that has a crack in it may be made by mixing soluble glass with wood ashes. This cement will not bear moisture. A lump of soda left on a drain-pipe down which waste water passes will prevent the clogging of a pipe with grease, especially if the pipe is flooded every week with holling water. For poisoning from phosphorus, as when children suck matches, give a tablespoonful of magnesia, and then, freely, gum arabic water; less magnesia if only a little phosphorus is taken. Don't allow any loose-jointed gas brackets on your premises which could be swung against wood-work, or any brackets without wire screens or glasses, if hay, straw, light materials or window-curtains are near them.

THE New Westminster (B. C.) *Columbian* says the adaptability of the Puget sound fir to fine car work is replacing the higher-priced walnut and Louisiana ash, as well as West India mahogany. For some time past the Royal City Mills, New Westminster, have been shipping sill timber to the largest car works in the United States, and new orders are constantly being received from them—a sufficient proof of the satisfaction the lumber gives. A short time since four carloads of sill timber were shipped to the Crossen Car Works of Coburg, Ontario, the first of a large order just received. The timber is all 65 feet in length, of the best quality, and not a knot or flaw will be found in any stick of it. This lumber will be used by the Crossen works on the palace and first-class cars now being built for the Canadian Pacific Railroad.

HOW TO SAVE COAL.—Take coke, soft coal and wood; mix the coke and coal in equal proportions. The great heat of the coke will entirely consume the smoke of the soft coal, all of which passes off when that coal is burned by itself. A little dry wood added to the fire occasionally will also effect some saving. Fuel thus used will be found much more economical than either used separately. This information may be of special use at this time, while our California coal barons are putting their heads together to keep up an artificial price for coal. The writer got ahead of them by pulling out his old brick range and substituting an Elmwood range, purchased of Anderson & Tallon, No. 12 Market street.

THE JUG is a most singular utensil. A pail, tumbler or deoanter can be rinsed, and you can satisfy yourself by optical proof that it is clean; but the jug has only a hole in the top, and the interior is all darkness. No eye penetrates it; no hand moves over the surface. You can clean it only by putting in water, shaking it up, and pouring it out. If the water comes out clean, you judge you have succeeded in cleaning the jug, and vice versa. Hence the jug is like the human heart. No mortal can ever look into its recesses, and you can only judge of its purity by what comes from it.

AN EXPERT SKATER.—The Emperor of Austria, Francis Joseph, has a country seat in Vienna, and on this fine royal estate is a lake which in winter is used as a skating pond. During one of the latest Austrian "cold snaps" an expert Vienna gentleman went skating there, with a little reservoir of ink adjusted to the hock of his skate in such a way as to allow the ink to flow out in a fine steady stream. Then off he started, and before he had skated long there appeared the name of the Crown Princess beautifully and plainly written upon the ice.

Product of Comstock Mines.

Following is a statement of the ore and bullion product of the Comstock lode mines for the quarter ended June 30, 1888, obtained from the official reports of superintendents now on file in the Assessor's office:

Con. Cal. and Virginia

Produced 40,463 tons of ore, yielding a total of \$1,027,294.89 in bullion; average yield per ton, \$25.33; actual cost of extraction, transportation and reduction, \$614,419.92; net yield above cost of production and subject to bullion tax, \$412,874.97; total bullion tax on net proceeds, \$12,386.25.

Ohollar

Produced 4750 tons of ore, yielding a total of \$74,507.24 in bullion; average yield per ton, \$15.65; actual cost of extraction, reduction and transportation, \$11,983.74; cost of production above yield, \$7,476.50; no tax.

Confidence

Produced 17,285 tons of ore, yielding bullion valued at \$401,293.18; average yield per ton, \$23.85; actual cost of extraction, reduction and transportation, \$239,898.18; net yield above cost of production and subject to bullion tax, \$161,395; bullion tax, \$5648.83.

Hale and Norcross

Produced 18,075 tons of ore, yielding bullion valued at \$451,740.08; average yield per ton, \$25; cost of extraction, transportation and reduction, \$305,883.13; net yield above cost of production and subject to bullion tax, \$145,856.95; bullion tax, \$4375.70.

Yellow Jacket

Produced 7080 tons of ore, yielding bullion valued at \$55,022.04; average yield per ton, \$7.80; cost of extraction, production and transportation, \$38,333.03; cost of production above yield, \$33,310.99; no tax.

Recapitulation.

The total number of tons of ore extracted during the above quarter, according to the above statement, was 77,653 tons, producing bullion valued at \$2,009,812.43. The product of the Savage is not included in the above list, which will swell the total to \$2,529,000. The product of the last quarter of the current year exceeds that of the yield of the preceding quarter by nearly \$600,000.

Working Tests by Russell Process.

Arrangements have been made by which ores, tailings, etc., may be treated experimentally on both a small and large scale by the Russell process. Treatment on a large scale should be preceded by tests made on a small sample, for which the charges will be as follows: Raw material for raw treatment, \$8; material already roasted, \$8; raw material for roasting treatment, \$10; raw material for both raw and roasting treatment, \$15.

The sample, weighing at least 20 pounds, and crushed not coarser than through an eight-mesh wire screen, should be addressed, prepaid, to W. A. Wilson, Marsac Mill, Park City, Utah. The treatment desired should be specified.

In case it is desired to have tests made on a working scale, carload lots of ore (in sacks) for raw treatment, of roasted ore, or tailings, will be treated at an expense to the shipper of freight charges only. The grade of the ore is immaterial. In all cases the product will be retained by the company making the test.

In the case of raw ore requiring roasting, the value of which is less than \$34 in silver and gold, there will be a charge for treatment depending upon the grade of the ore. Such sample lots will be treated in a Stetefeldt furnace, and as this will cause an interruption in the regular work of the mill in which they will be treated, there would be less profit to the company on ores lower than the above grade.

Parties desiring to have their ore tested by raw leaching, preliminary to concentration, can have the tailings from the leaching returned to them for further treatment.

LIFE IN THE MINES.—In some countries it would seem strange for a party going to see a theatrical entertainment to make a dive into Mother Earth, travel four miles under the mountains and then dart up to the surface within a stone's throw of the ticket office, but it is after such a fashion that some of our people go for their regular dose of drama, comedy or tragedy. Last night a party of ladies and gentlemen of the town of Sutro, who wished to see "The Two Johns," at the Opera House, took the short subterranean cut. Starting at the mouth of the Sutro tunnel (at their own doors), they came up the tunnel to the C. & C. shaft, a distance of a little over four miles. Dismounting from their cars they then hoarded the cages in the shaft and were shot upward to the surface a vertical distance of 1640 feet. This way of going to a theater is as much fun for our ladies as going to a picnic. It is really a pleasant trip, but until a lady has become somewhat accustomed to life in the mines it requires a little nerve. It is fine and cool the whole four miles of the way underground. The cars will not soil even the most delicate dresses of silk and satin, therefore there is no trouble about changing clothing. In her room at the mouth of the tunnel a lady may stand before her mirror and give the finishing touch to flower or feather, and in just such shape as she turns from her glass she is shot up to the surface in this city, ready to take a seat in her box in the Opera House.—*Virginia Enterprise*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

LIVERMORE COAL CO.—*Livermore Herald*, Aug. 9: A contract for sinking the Richards incline to a 300-foot level was signed on Sunday last, and work begun on Tuesday. The contractors are two practical miners from Mt. Diablo. The incline is 8x9 in size, being thus somewhat higher than the vein. Two shifts of men will be run, working night and day. Each shift consists of an engineer, tub-man, and two miners. In this manner the incline will be put down about six or eight feet a day. There being considerable water, the work will be continued without intermission, until completed. A boarding and lodging house is now being erected, near the mouth of the incline. Parties who have visited the mine during the past week say the vein is looking exceedingly well, being now five feet thick, and all good coal.

Amador.

SUTTER CREEK.—*Cor. Amador Ledger*, Aug. 11: The little mining that has been going on here has been brought to a standstill on account of the failure of the water supply. Mr. Stewart has shut down for lack of water to run the mill, and the Iowa or Sutter Creek mine has hung up stamps for the same reason. At the Wildman mill will shut down, as it was found difficult, if not impossible, to keep the mill going and sink at the same time. It will probably be some months before we hear the sound of stamps in motion again.

PLYMOUTH.—The town is very quiet, owing to so many of the miners having gone away to seek employment at other mines, some of them taking their families along with them, and others leaving them here, intending to return as soon as the mine starts up again. There is a great variety of opinions about when the mine will start. Some say this fall, but others think that it will not be in running order again. We do not hear any more talk about putting up a mill on the New London mine, although the general report is that there is a good lead of ore in the mine. The Lady Bedford mine is still sinking, and reports are that some rich rock is being taken out of the mine. Reeves & Way are sinking a shaft on their mine, and we hear are finding some rich float rock as they go down.

MILL BURNED.—*Amador Ledger*, Aug. 11: The five-stamp mill on the Reed and Askey claim near Irishtown was utterly destroyed by fire on Thursday morning of last week. The owners have already purchased a five-stamp mill in Calaveras county, and have started in to repair the disaster. It is proposed to build a ten-stamp mill, using the five stamps of the old mill. It is intended to operate the mill by water-power by means of a large undershot wheel placed in the canal, which runs close by, thereby reducing the cost of motive-power.

El Dorado.

CUT RICH ORE.—*Placerville Observer*, Aug. 7: The True (Young Harmon) Mining Co. has been engaged for several years running a tunnel to strike their ledge. During the past week they cut some very rich ore of a sulphide nature, showing some free gold. Some of this ore is estimated to pay \$2000 per ton. The tunnel is now in 1400 feet, and at the point where they find this rich ore they have 700 feet of backs. This strike should stimulate the Big Tunnel Co. to action, as their tunnel must in time crosscut this same ledge. It is reported that the True company will start up their mill before long.

LACK OF WATER.—*Placerville Observer*, Aug. 11: The running of the mill at the Chic and Ohio mine has been suspended for a time, on account of water. They intend putting in steam-power, having ample water for all other purposes. We understand that the Gopher Boulder M. Co. of Kelsey district will begin extensive operations as soon as Supt. Pearson arrives from England. The new concentrators at the Josephine mine have been put in place, and work in the mill will be resumed at an early date. Mr. Raw, superintendent of the Independence mine, near El Dorado, exhibits some very rich ore taken from a new shaft on that mine 20 feet deep. This old bullion-producer may come to the front again after so many years. The gold is there.

WILL COMMENCE.—*Georgetown Gazette*, Aug. 9: We understand that the Gopher Boulder Mining Co. of Kelsey district will begin extensive operations as soon as Supt. Pearson arrives from England. I. A. Woodbury has been overseeing the placing of the new concentrators at the Josephine mine. The Kentucky tunnel, owned by A. J. Wilton, is now 800 feet in length and is now into a fine body of gravel. This on the same channel from which Mr. Wilton took his "gold potatoes" a few years ago, and we expect to hear of him taking out some more in the near future.

Inyo.

PROSPECTING.—*Index*, Aug. 9: Sam Gruber and Julius Schroeder have gone to Kearsarge mountain to do assessment work for Henry Levy on the Cleveland mine, formerly the Silver Sprout. They will also prospect some in that vicinity.

POLETA.—*Inyo Independent*, Aug. 11: George Story is finishing up two or three small lots of ore at the Maxim mill. The ore was taken from the Poleta and one or two claims in the same neighborhood. The yield of gold is about the same as usually found in the same claims.

CONCENTRATING.—Frank Fitzgerald has had constructed a machine for concentrating fine ore and fine dust which is a success. He has on hand some 1200 tons of material which he will concentrate, and which promises good returns.

CERRO GORDO.—Jack Dunphy and his partner, O'Keefe, are shipping 60 tons of ore they have taken out at Cerro Gordo. The lot was gathered in little dabs and has been a long while accumulating.

DARWIN.—Darwin is very quiet at present. The low price of lead discourages miners. Lead is admitted from Mexico free of duty under the fiction that it is silver ore, and as wages in that country are extremely low, our own lead miners are driven from the market. J. C. Eddy is not operating any mines at present; he says nothing can be made in the mines under the present conditions. A little ore is taken from the Defiance mine, but very few men

are at work there. At the Lucky Jim Mr. J. A. McKenzie has a few men at work, but not much is doing. Mr. C. Anthony has got a renewal of his lease of the Haggin mine, over in the Slate Range, and will do a good deal of work there as soon as the weather gets a little cooler.

Nevada.

AIR-TUNNEL.—*North San Juan Times*, Aug. 11: Messrs. Cral and Trood are working steadily at their gravel-dredging in the American diggings. They have been doing considerable deadwork lately in the way of running an air-tunnel. This ventilator is the second they have been obliged to put in, but when finished it will repay them for its construction by facilitating greatly their drifting operations, which have heretofore been retarded by the slowness with which the powder smoke from their blasts left the working-tunnel.

STRUCK BEDROCK.—*Transcript*, Aug. 9: At three o'clock Tuesday morning the perpendicular shaft being sunk at the San Jose drift mine in Washington township, 16 miles northeast of this city, struck bedrock near the south rim of the channel at a depth of 250 feet. There is five feet of barren gravel on the bedrock which is pitching off rapidly in a northerly direction. Wm. Adams and Mr. Hargis, who had the contract for sinking, began there last November. Under favorable circumstances they would have completed the job ten weeks ago, but the flow of water has been so heavy as to delay them greatly. Mr. Adams telegraphed yesterday to the owners in San Jose that the contract is completed and to come up and accept the work. He thinks that a drift 150 feet in a northwesterly direction will penetrate the center of the pay dirt. The company has been operating there some four years and has spent upward of \$25,000. The prospect now is that they will receive big returns for their outlay. The San Jose is a mile south of the Centennial drift claim and is supposed to be on the same channel.

COPPER.—*Tidings*, Aug. 14: The old dump-pile of the Spenceville copper mine is proving a valuable bonanza to its owners. They say there is enough of copper in it to last for years without hoisting a pound of ore.

Placer.

FOREST HILL DISTRICT.—*Placer Herald*, Aug. 11: Jo Federer is taking out rich gravel at the Small Hope. P. Edwards and E. Richards have found very good indications in the Sebastopol. Their tunnel is in 230 feet; the gravel grows richer as they advance. C. Wason is running a new tunnel in the Consolidated Mammoth mine. He expects to run 400 feet to strike the channel. His claim is on the same channel as the Mayflower. The Baker Divide Co. is still running ahead. Andy Steel is running a tunnel into the Blackhawk mine. Breece & Wheeler are still running ahead; the gravel is getting richer. Work has been retarded by caves. The engine and boiler for the Dardanelles mine arrived on the ground last Sunday. As soon as possible they will be put in place. The mine had been paying big, until the failure of water necessitated the stopping of the mill. The engine is of 40-horse power, which is more than sufficient for ordinary purposes, but Gen. Hamilton thought it prudent to have a surplus of power.

San Bernardino.

DEATH VALLEY MINING PROSPECTS.—*San Bernardino Index*, Aug. 7: Messrs. D. C. Conkling and H. A. Thompson have just returned from the northern end of Death valley, where they have located a number of valuable claims which they describe as very promising. One of their favorite locations they named the "Friday" mine, from which an *Index* reporter was yesterday shown some very fine specimens. Mr. J. A. Shedd, the assayer at Colton, made tests of this rock, which yielded \$59.51 per ton in silver and lead. There being no antimony in this ore, it is not at all rebellious and will reduce easily. So far there has been but little development put upon these claims, but the indications all point to permanence and improvement as depth is reached. The country rock is of iron, capping a lime formation through which the fissures bearing the ledges have been broken. In the vicinity the two prospectors also discovered a large deposit of beautiful marble of the finest imaginable grain and texture. Specimens brought into San Bernardino are as fine as any Carrara marble ever put into statuary, the deposit they describe as a cliff formation, standing above the valley several hundred feet and located where it can be quarried at the least possible cost. With the investment of very little money, and rail transportation close at hand, the marble alone will be a very valuable property. The projected line of the Carson & Colorado railway runs within six miles of both the mining claims and the marble deposit, and the construction of that road will make them easy of access and profitable for operation.

Shafts.

OLD DIGGINGS.—*Courier*, Aug. 10: Frank Pantler, one of the partners in the Mammoth mine, Old Diggings, says the mine is looking fine. The new tunnel in the Mammoth will tap the ledge 150 feet lower than the present works. The ledge is 14 feet wide.

A SALE OFF.—A \$6000 cash sale of a mine was declared off this week because there was no Government patent to it, and a never-sweat loafer who never did a day's work on the ground stuck up a notice claiming part of it. The man of money said he didn't want to buy a mine and dispute for a clear title afterward. Therefore for want of expending a few dollars for Government title, a good sale was lost. Secure Government titles as soon as possible, for mineral, agricultural or timber lands; then you are secure, and know just what you possess.

BROWN BEAR.—*Redding Free Press*, Aug. 11: From Mr. P. Evans, who came in from Deadwood last Wednesday, we learn that the Brown Bear Co. has purchased the whole of the Gibson property—the Black Bear, Enterprise and the famous Little Gem—for \$30,000. Joseph Falin, who has honestly and faithfully worked the old Vermont mine, is at last reaping his reward; he is running a tunnel to tap his recently discovered ledge. He is now in about 150 feet and will have to go as much more before he reaches the ledge. It is farther south than any that had yet been discovered about the Vermont mine. Judge Stowell has just made arrangements for opening his silver ledge which lies about halfway between Iron mountain and Windy camp, and is about six miles from Copley. At the latter place he will put up a building, at the railroad track, in

which to store his ore previous to shipment. He has hired enough pack animals to carry a ton of ore a day. He will have a rock-breaker at the mine.

Sierra.

BUFFALO.—*Cor. Mountain Messenger*, Aug. 11: The indications at the Buffalo mine, Hog canyon, are very good at present. The company has developed the mine, and with the ore that is in sight a guarantee of the building of a mill this summer. They have a shaft down a distance of 50 feet with very rich rock at the bottom. Tunnel No. 1 has been driven 350 feet, and the pay chute was found at 300 feet. Tunnel No. 2 is now in a distance of 100 feet with the same indications as that of above the ledge. In No. 2 a crosscut has been run and shows very rich ore, which is of a decomposed nature and is good milling. Tunnel No. 3 will be started in a short time on the opposite side of the bill.

Siskiyou.

CRUSHING.—*Yreka Journal*, Aug. 11: The Warren quartz-mill, on Yreka flats, has just finished crushing a quantity of quartz taken from the Mills & Hart ledge of Humboldt gulch, but owing to the dangerous illness of Johnnie Hart, a cleanup has not yet been made to ascertain how much amalgam or gold has been realized. The Schroder and Werner ledges at head of Deadwood are now being worked with the great-st energy and success, some 14 hands being constantly employed. The miners at Hawk-insville and vicinity have been able to perform considerable work at mining this season, with a steady supply of water from the Big ditch, which has been furnishing more water steadily this season than during previous seasons.

Trinity.

QUICKSILVER.—*Redding Free Press*, Aug. 11: A. J. Lytle, the first discoverer of quicksilver mines in Trinity county, went up to the county this week to develop his quicksilver interests, which have for some time lain dormant.

Tuolumne.

MILL-SITE.—*Sonora Democrat*, Aug. 11: The grading for the 20-stamp mill at the Eureka mine is about completed. The site of the mill is close to the present hoisting works. We are informed that the bond on the Hyde mine has been forfeited, by reason of a failure of the negotiators to comply with its conditions. Two separate parties, one in San Francisco and the other in New York, are now negotiating for its purchase.

SUMMERSVILLE.—Summersville is expecting a large revival of prosperity, business activity and mining resumption in consequence of the early opening by a heavy company of the Eureka mine. This mine has not been worked since the early era of quartz mining in California. It ceased operations at a time when \$7 or \$8 quartz would not pay. Parties who worked in the mine then and have the knowledge whereof they speak, say that the Eureka was worked down to a depth of over 500 feet, and at that depth it was about 15 feet in width, had good walls and showed a fine quality of quartz. Subsequent progress in mining and attendant sciences have now made it possible to mine and mill ore that pays even but \$2 per ton. Therefore the above mine will now yield handsomely, and besides it will stimulate similar enterprises in Tuolumne. The New Albany mine, just across the river from the Eureka, is nearly a similar proposition. It has large bodies of ore, all of which will now pay well, and in addition it contains chutes known to be rich. The same company ought to own the two properties, as the same mill placed on the river could readily receive and work the quartz from both mines.

WORKING WELL.—*Independent*, Aug. 11: Mr. Frishie, who moved the mill that was formerly on the Experimental Gulch mine to his Sunnyside mines on the mountain-round above Columbia, reports that the mill is working finely—saving all the gold—in fact, doing all that the inventors claim for it.

BLACK OAK.—It is expected by the first of next week to have the Back Oak mine running by water-power, thereby saving a big expense to the company.

NEVADA.

Wahoe District.

OCCIDENTAL.—*Virginia Enterprise*, Aug. 11: Lower tunnel: 75 feet south of the north incline winze the upraise has been carried up 15 feet; total, 201 feet; 150 feet south of the same winze the south drift has been extended 7 feet. Have extracted 150 tons of ore, and shipped to Atlanta mill 125 tons; average assays of wagon samples, \$24.

HALE AND NORCROSS.—During the week have hoisted 702 tons of ore from the 600 and 700 levels, and have shipped to the Nevada mill 567 tons. Average battery assays, \$48.86 per ton. All the stopes throughout the mine are looking very well. The west drift on the 500 station has been advanced 40 feet. Have men on repairs in the main shaft and other parts of the mine. The bullion yield for the month of July will amount to about \$86,000.

SAVAGE.—During the week have retimbered 47 feet of the main shaft between the 800 and 900-foot levels. The south drift, 500 level, has been advanced 46 feet. No ore has been extracted since last report. The bullion yield for the last month, amounting to \$16,059.11, has been forwarded to the San Francisco office.

CHOLLAR.—The north raise from the 650 level is in ore of fair milling grade. The usual work progresses throughout the mine. The building in which to place the motors to receive the power from the Pelton wheels in the shaft is approaching completion.

GOULD AND CURRY.—During the week there has been extracted from the 250 and 300 levels and shipped to the Douglas mill 227 tons, 1305 pounds of ore, the average battery assay of which is \$24.47. Bullion on hand in assay office in Virginia of the value of \$2640.69.

CONFIDENCE.—General repairs throughout the mine are being carried on. We are shipping daily to the Brunswick mill for reduction 175 tons of ore, the average battery sample of which shows a value of \$22.27 per ton.

ALTA.—Are opening a new station in the Alta and running a drift to the west to cut the vein on the 725 level. Have built three reservoirs below the mill to catch the slimes and tailings.

YELLOW JACKET.—Are doing some good prospecting on the upper levels. The shaft is in splen-

did condition. It is as good as any other on the lode, and the cages never ran better in it.

ANDES.—Drifting west from the bottom of the winze on the 240 level, and running south on the 350 level. Both drifts often encounter occasional bunches of good ore, which is saved for milling.

CHALLENGE CON.—Work on repairs and prospecting continues as usual on the 1000 and 1100 levels. Some ore of fair grade is being developed on the 1000 level.

BELCHER.—The Suto tunnel drift is out 530 feet. The shaft is now open to the bottom, and is in good condition, with the exception of requiring new guides in places.

WEST YELLOW JACKET.—Stringers of rich ore coming in on the raise, and as soon as connection is made will commence to extract it.

CROWN POINT.—The 700 crosscut advanced 36 feet during the week through a mixture of quartz and porphyry giving low assays.

ALPHA AND EXCHEQUER.—Sinking and retimbering the main shaft below the 380 level. Prosecuting work on the 122 and 222 levels.

LADY WASHINGTON.—Running a northwest drift on the 725 level. The ground has the appearance of approaching vein matter.

BALTIMORE.—Some streaks and bunches of good ore are encountered on the 300 level, where the usual work is being done.

CON. IMPERIAL.—Repairs to the main north lateral drift on the 1100 level are still being continued.

BULLION.—Have started to drift south on the 640 level, and are crosscutting east on the 500 level.

SCORPION.—The south drift on the 500 level was advanced 12 feet during the week.

IOWA.—Everything in and about the mine is in good shape.

Eureka District.

NEW PAN.—*Eureka Sentinel*, Aug. 11: A new zinc pan is being put in at the Eureka Con. refinery in place of the old one, which was cracked. The damage was done while using it to make market lead, since which a new process has been used.

Hawthorne District.

GOOD REPORTS FROM THE MINES.—*Walker Lake Bulletin*, Aug. 8: The reports from the mines in Hawthorne district are cheerful. The ore is rich and abundant, and in the claims in process of development (so that systematic mining may be done when stoping begins) the prospects seem to be constantly improving. There is much talk in the newspapers about the rich discoveries in other places—Humboldt county, Tuscarora, Sierra City, etc.—but it is the belief of prospectors who have grown gray in the business that we have the richest gold quartz district on the coast right here in Esmeralda county. It is young and comparatively undeveloped, but in time, if present indications are realized, we will show a bullion product second to none. Several loads of ore from the New York mine, in Hawthorne district, have arrived during the past week, and more is coming. It will be shipped hence to the Kincaid mill for reduction. This mine is the property of Messrs. Knapp & Laws, but it is now being worked under a lease. The ore is rich and handsome returns are anticipated. The Kincaid mill is already crushing Lapata ore, and next week the stamps will begin dropping on rock from the New York, now in transit. The Pamlico will soon begin shipping, also the Cypress and Hartford, all in Hawthorne district, and the Ontario in Moss district.

Pioche District.

NEW LOCATIONS.—*Eureka Sentinel*, Aug. 11: In Pioche District, Lincoln county, 12 new mining locations were recorded the last week in July. The activity is due to the prospect of a railroad being built through that region next year.

Wild Rose District.

PARADISE MINE.—*Silver State*, Aug. 10: Frank and Charles Boskovich returned yesterday from a tour of observation in Paradise valley and Spring City. They say that a body of ore has been found in the Wild Goose mine, which belongs to the Paradise Valley Mining Company, and that Supt. McCurdy increased the force of miners last Wednesday. They say, too, that very rich ore has been developed in the Cliff mine, which is being worked by Todhunter & Frayer, but in consequence of the scarcity of water at their mill the ore cannot be worked at present. The Paradise Valley Co., under the management of Mr. McCurdy, has produced hundreds of thousands of dollars, a part of which has been paid in dividends to stockholders, and the balance, save what has been expended for machinery, paid to miners, and through them found its way into general circulation. It is within bounds to say that the Paradise valley mines have caused to be expended among the farmers and business men of this county an average of \$10,000 per month since it has been in operation.

ARIZONA.

GROOM CREEK.—*Cor. Prescott Courier*, Aug. 9: Groom Creek district covers ground drained by the creek lying south of Prescott and west of Walker district, and has within its limits a great number of mineral veins, which have produced a large amount of gold and silver, and are still so doing. The Standard ten-stamp mill, under the management of J. S. Jones, is running on Spruce mountain gold and silver ores; the stamp, crushing and concentrating mill is working custom ore. Several mines in this district turn out high-grade silver ore, considerable of which was formerly shipped to Colorado or San Francisco. The Benjamin, Adel and Nevada claims yield ores worth from 400 to 2000 ounces silver per ton. A promising group of claims adjoining on Spruce mountain, some half-dozen in number, have recently been patented and owned by an incorporation called the Montezuma Gold and Silver Mining Co. The average assay value of the ores runs about \$40 in gold and 40 to 60 ounces in silver per ton. Selected ores sold to the sampling works at Prescott have yielded over \$100 a ton. The mines of this district are the nearest productive mines to Prescott, six to eight miles distant. The district is easy of access by good roads, is covered with timber and has a more bountiful supply of never-failing water than many other sections, and is therefore looked upon as likely to be the site for the reduction works, which, in the near future, are certain to be erected at some suitable locality on

the line of railroad. Nothing but surface work has been done in this district; there is not a shaft 250 feet deep and very few 100 feet deep. Water is encountered everywhere, which stops the exploration of veins by the miner of small means. Enough has been done just to show the possibilities that exist of the presence of large and rich deposits of mineral in the veins already found and partially prospected, and to demonstrate the fact that Groom creek district is a field which offers good inducements to those with the necessary funds to prosecute the work of development on the promising prospects existing therein.

BRADSHAW.—Prescott *Courier*, Aug. 11: Tom Collins tells us that mines belonging to the Moody & Place and Ora Bella companies in Bradshaw, increase in size with every foot sunk upon them.

TIP TOP.—Miners of Tip Top district keep right along taking out rich silver ore and shipping the same to "foreign" smelters. They could ship their ores around the world and still get big pay out of it. It is the best choosing camp in the Southwest and has the best miners.

COPPER.—Large shipments of copper-silver bullion are constantly going east from Jerome, the big copper camp of Northern Arizona.

THE SILVER KING.—*Florence Enterprise*, Aug. 11: Mr. H. H. Noble, president of the Silver King M. Co., says the recent financial troubles of the company were more apparent than real, and resulted from an improvident indifference upon the part of its former management. The unusually large outlay for improvements in the milling facilities and the thorough exploitation of the mine, in conjunction with a run of several months upon a lower grade of ore, caused the outlay to temporarily exceed the product of the mill. The improvements have been about all completed, and while a greater measure of economy in the treatment of the ore will result, a gratifying appreciation in the value of the ore will swell the profits to a satisfactory figure. The output for the month of July aggregated 91,932 ounces of silver, and, barring accidents, the August product is expected to exceed these figures.

THE YUMA C. AND S. M. CO.—*Phoenix Herald*, Aug. 9: This company has been developing its claims in the Harecur mountains for the past two months with a force of 20 men. Working shafts are being sunk on the Fond du Lac, Black Bear and Cumberland mines. The shafts are sunk on the ore and thus far the result of development has more than justified anticipations. The deepest shaft at the present writing is 75 feet. It is the intention of the management to prosecute the development work until no possibility of failure can exist and then to erect suitable reduction works. The company will at once let a contract for sinking wells upon the property. It is intended to bore the wells and then introduce suitable lift pumps, such as are in use along the lines of the S. P. and A. T. & S. F. railroads. The character of the Yuma ore is copper glance with more or less feruginous chrysocolla with the addition of a small amount of limestone; the ore can be readily smelted in the ordinary Pacific water jacket.

BRITISH COLUMBIA.

THE NEW PLACER CAMP.—Donald *Truth*, Aug. 7: Enough is now known of Porcupine creek, which is but 18 miles from Donald, to prove it good placer ground. It is easily accessible from the railroad; the bedrock in places is not deep; the dirt gives returns almost from the grass roots, and there is plenty of water. Every man who has returned from the camp reports the discovery claim as unquestionably rich—good for \$20 a day to the man, at least. If that be true, there are other claims likely to be just as good. At present some 30 claims have been staked off and recorded. Lumber is being whipsawed for sluice-boxes, and the actual work of opening up claims is already under way. The trail in will probably be completed to-day.

WORK PROGRESSING AT FIELD.—At Tunnel mountain, three miles from Field, work is being pushed in preparing the ground for working the mine successfully, and ore will be shipped to Vancouver by September. A tramway to connect the mine with the railroad track is under way, the ore cars and other material being expected daily. John Barr of Anthracite has the contract for building bridges over the Kicking Horse between the mine and Field. The company has a large ore-body in sight, and as soon as they begin shipping in earnest, the outside world will awaken to the fact that there is at least one producing mine in the Kootenay district.

COLORADO.

LEADVILLE.—*Cor. Denver Tribune*, Aug. 9: The lease and bond on the Virginian property has been taken up. The parties leasing this claim have expended about \$40,000 exploring the ground in the last ten months, and as the bond was \$50,000 the owners agreed to reduce that sum considerably if the bond was taken up within 30 days. Accordingly it was raised this week. Development is being made rapidly upon this mine. The Brookland discovery on the Adams is being rapidly developed. The shipments average about 40 tons daily and the average runs net about \$33 per ton from the smelter. A level from the Maid of Erin mine has been extended into the Big Chief grounds. It is reported here to-day that the level will be extended to the Castle View property. The ore body which has been encountered is running over 50 per cent lead and about 40 ounces in silver. The Hamburg shaft on Breche hill, east of the Highland Chief, is being steadily worked by Woodrow & Co. This development, which is more than likely to prove profitable, will open up a piece of territory which has been idle nearly eight years, and from which ore was taken in the early days of this camp. Messrs. Jas. Doyle of this city and William Farrish of Denver are taking out some excellent ore from the Best Friend at the head of Big Evans gulch. The leasers of the Four Per Cent are still drifting with the hope that they will soon strike another valuable body of mineral. A strike was made yesterday in the Seneca shaft. Two feet of sand carbonates was discovered at the depth of 250 feet. Ground has been broken up for the concentrator to be put in at the Wolfstone mine. It is warranted to have a capacity of 200 tons per day. Considerable interest is being manifested in Leadville over the boom which the Horseshoe region is now receiving. Leadville is

the supply point for that country, and two coaches leave here daily loaded with passengers for Horseshoe. Eastern parties have leased what they believe will prove paying properties. Nearly all the available ground has been taken up. It is estimated that there are about 600 men prospecting and at work at Horseshoe. The Hilltop, Peerless and Last Chance mines are now shipping first-class ore. Over 50 teams are employed in hauling from the first of the above three mines.

DAKOTA.

MONARCH.—*Deadwood Pioneer*, Aug. 8: At the bottom of the Monarch shaft, now 150 feet deep, very good ore has been found. Supt. Bachman reports work going on steadily, progressing favorably, and that the appearance of the property is improving with every foot gained in sinking. The formation the shaft has now reached is similar to that in the great Homestake mine, viz., a talc slate. The shaft will be carried down another 100 feet, and when a total depth of 250 feet has been obtained, the permanent crosscut will be made. The Monarch Co. is one of the strongest companies operating in the Black Hills. The stock is held in large blocks, and by men of large means who are willing and able to thoroughly develop the property. The mine has shown excellent prospects from the first stroke of the pick at the surface, until now the shaft has reached the depth before mentioned. The chances are strongly in favor that the property will, before long, be not only upon a self-sustaining basis, but also in condition to warrant the erection of large stamp-mills to reduce the ores from which many dividends may ultimately be expected.

HARTSFELD SMELTER.—*Deadwood Pioneer*, Aug. 9: The long awaited coke for the Hartsfeld smelter at length reached Sturgis late Tuesday night, and was yesterday hauled to Galena. The little plant blows in this evening on ore from the Bullion and Merritt mines. During the period of enforced idleness many improvements were made, and the chances are that no necessity to close down for any purpose is likely to arise for some time.

ANOTHER SMELTER.—It was common talk yesterday that a company made up of Minneapolis and St. Paul capitalists are about putting up a 25-ton smelter at Galena. Report had it that work, grading the site, had already commenced. This was premature, though a well-informed broker states he has reliable advices that machinery for the plant has already been shipped. The men putting up the plant have lately become largely interested in the Silver Queen, one of the best mines in Bear Butte district, and the smelter will be erected to treat its ore.

IDAHO.

SEAFOAM.—*Ketchum Keystone*, Aug. 11: Thos. Tague returned from Seafoam yesterday and reports the outlook in the new mining district still very encouraging. The prospects for a rapid development of the country are improving. Pat Kelly has just had some rich float assayed and it went over 800 ounces. It was found on Float creek.

SHEEP MOUNTAIN.—John Dowling, a mine-owner of Sheep mountain, arrived here late Wednesday. Mr. Dowling says the prospects are very favorable for a sale of two mines out there—one, the Eureka, owned by Bonanza men, and the other owned by Hon. G. B. Baldwin. There are now about 250 men in the Sheep mountain country.

MONTANA.

IRON ROD.—*Inter-Mountain*, Aug. 6: Wm. Owsley is home from a visit to his gold mines at Iron Rod. He has two properties there and is getting them in pretty good shape for realizing plenty of profit from working them. His present work is devoted principally to developing. The ore body is about four feet wide and it is free milling, running about \$30 to the ton. The shaft is now below water level, and there is little likelihood of a change in the character of the ore. He is putting in two of the Candle stamps, each of which is supposed to have the capacity of about five ordinary stamps. They each weigh 950 pounds, and besides having a rapid motion—125 strokes to the minute—they have also a grinding motion which expedites crushing very much. They are probably started up by this time. The Iron Rod mine is a very rich property. It is opened to a depth of 600 feet and has plenty of ore. Mr. Owsley says the ore mills \$50 to the ton. They have a 16-stamp mill running regularly, and it is pounding out a pile of wealth. The Broadway is not in operation. Unlike the generality of ores in that section, the Broadway ores have become very refractory. There are a good many promising gold properties in this district, and Mr. Owsley expects to see a big output eventually from there. At present, however, the only mines that are being worked to any extent are his own and the Iron Rod.

DEAL FOR THE SILVER BOW GROUP.—*Butte Inter-Mountain*, Aug. 10: A big mining sale of Butte properties has been pending for several days and is now understood to be consummated, all that remains being to get up the necessary abstracts of title and make out deeds, etc. The properties concerned are what is known as the Silver Bow group of mines, of which A. J. Davis and James A. Talbott are the owners. They comprise the Gray Rock (silver-copper) and the Josephine, Sister, Flag, La Plati, Belle of Butte and others; also the Silver Bow mill. The purchasers are Boston, Philadelphia and Michigan men. The purchase price is said to be \$1,250,000.

THE NARROW GAUGE.—Irvine & Co., who have been at work sinking on the Narrow Gauge for the past three months, having now reached a depth of 175 feet are running a level to catch the chute of ore which was worked out above the 110-foot level. They already have a streak of very rich ore in the face of their drift six or eight inches wide, and it is widening.

THE SITUATION.—*Inter-Mountain*, Aug. 11: In mining circles during the past week several important events have been recorded. The negotiations for the purchase of the Silver Bow group of mines, embracing a score of properties, are understood to be progressing favorably. The Bluebird is now in better shape than ever. The addition of a cylinder furnace to the mill increases its capacity to 130 tons, which amount is now being daily treated. Nothing

has been heard from the Lowlands during the week, but it is known that the Anaconda people have secured some more property there and are sinking the Ruby shaft with all possible expedition, and with three eight-hour shifts of the best miners they could procure. The Barton Consolidated concern turned out 2,000,000 pounds of copper for July, and have enough money in the treasury to pay a second dividend of \$200,000.

NEW MEXICO.

MINING LOCATIONS.—*Southwest Sentinel*, Aug. 7: From the first of January to July 31 there have been placed on record and filed for record 600 mining locations in the office of the clerk and recorder of Grant county. This number represents an area of 12,000 acres of mineral land, half as large as Gilpin county, Colorado. The annual expenditure on these, as required by law, involves an outlay of \$60,000. The locations have been made, a majority of them, on hitherto unexplored territory. The number on which the annual assessment of one hundred dollars worth of labor and improvements will be expended to hold them, will amount to about four-fifths of the whole. This labor and development, if development it may be called, is accomplished without the aid or assistance of outside capital and represents discovery, the primary step in mining. Usually the first year's work on a prospect is of the nature of a promise, and not until the second, third, or fourth year of constant labor, is that promise fulfilled, and often not then, unless perchance the prospector is exceptionally lucky and makes a ten-strike at grass roots.

CENTRAL.—Mining matters are quiet at present, but indications are very favorable that operations will soon be resumed on the famous Gulch mine and other properties of note in this district.

TELEGRAPH.—Competent authorities assert that with present facilities "ten-dollar rock" can be made to pay handsomely, over and above every item attendant upon the expenses of milling. The mill is in first-class condition, and the ore in sight in the various mines belonging to the estate is sufficient to run the mill for several months.

LEGAL TENDER HILL.—The iron ores now being mined on Legal Tender Hill are regarded as a very superior quality of fluxes, and as the demand for this quality of iron is increasing steadily, it is among the probabilities of prospecting that the quarrying of these iron ores for fluxes may lead to the discovery of exceedingly rich deposits of silver-bearing ores in this famous treasure-vault of the Chloride mountains.

WHITE QUARTZ.—Camp is 22 miles south of Silver City, and three miles east of the Big Burro Peaks. The mines have been located for several years past, and the developments and millruns, which have been made prove that this portion of Burro mining district is one of the three known gold areas in Grant county. A steam arastra furnishes the milling facilities, and the percentage of the values saved by the primitive method of arastraining, ranges from 80 to 95 per cent of the assay.

NOT SUCCESSFUL.—Silver City *Enterprise*, Aug. 10: The new-fangled mill erected by the Cleveland Mining and Milling Co. of Shakespeare is not a brilliant success. The mill after a run of a few hours was hung up—apparently to give it a rest. Col. R. N. Alexander of St. Louis, who is interested in mines in the San Simon district, proposes to erect reduction works on his property. The mines are situated six miles south of the railroad in the Stein's Peak mountains. The Volcano mine, which created such a commotion one year ago and suspended operations rather suddenly, will resume work very shortly. P. B. Smith of Deming having gained control of the property will assume charge.

MOGOLLONS.—Captain Cooney was in from the Mogollons this week and reports that Silver creek, upon which his mill depends for water, is entirely dry, something unusual for this season of the year. The captain's mill is shut down for the present, but will be started up as soon as there is water in the creek. While running the captain takes out an average of about \$500 per month with a five-stamp mill, employing only two or three miners.

VARIOUS CAMPS.—*Western Liberal*, Aug. 9: The Volcano mine, north of Stein's Pass, will start up soon. P. B. Smith, the principal owner, will assume charge. Frank Reno continues development on his Robert E. Lee mine at Pyramid. He is down 40 feet on his new shaft and is drifting both ways. The vein is widening. Last Saturday Supt. Foster came in from Gold Hill with a brick which weighed eight or nine pounds and was worth about \$2400, the result of the July run of the Standard mill, five stamps. Besides this brick the mill produced about \$1400 worth of concentrates. The Bachelor mine improves as more work is done in it. The main shaft on the footwall is down 175 feet and there are about 300 feet of levels run. The shaft is down about 60 feet and they are just starting a level. The mine has paid its way so far, and with a mill it would be a bonanza.

MINE MISMANAGEMENT.—Old Leitendorf, or Pyramid as it is usually called, possesses many truly good properties, which, if properly managed, could be made producers. Constant litigation, coupled with the fact that the best mines are owned by non-residents, has tended greatly to prevent development. The Last Chance, one of the oldest claims in the camp and a producer from the grass roots, has been lying idle for several years. The Pyramid Mining and Milling Co.'s property still continues undisturbed in its Rip Van Winkle sleep. The magnificent 20-stamp mill erected at a considerable outlay of capital is fast becoming a total wreck. All of this loss and decay can only be attributed to the folly of placing in charge, as managers of the properties, persons who, however competent in other walks of life, know nothing comparatively of the business they undertake to manage.

OREGON.

QUARTZ AND PLACER.—*Jacksonville Times*, Aug. 9: Work has been suspended at the Col. Iribledge for the present. Green Bros. of Galice creek are running a 150-foot tunnel to tap their ledge lower down, and are well along with their work. E. Sanderson Smith has several men at work on Gold Hill and is making good progress. Anton Rose, who rented Ennis & Cameron's placer claims in Galice creek district last season, recently cleaned up with good results. Henry Ankeny, who has been working the Saltmarsh diggings on a large scale during

the past season, will commence cleaning up soon. Wright & Pankey, of Willow Springs precinct, have struck another pocket of exceedingly rich quartz, and have one of the best ledges in Southern Oregon. Mr. McIntosh, who claims to represent California capitalists, is in Josephine county for the purpose of bonding a large area of placer mines in Grave creek district. Messrs. Goff, Davis and other miners from that section were at Grant's Pass the forepart of the week for the purpose of arranging the preliminaries. Reub. Jones and Johnny Coyle, who purchased a large quantity of tailings from Green Bros. some time since, sold them in Portland, after concentrating them. They paid about \$600 and sold them for over \$4000. This is more evidence that the quartz from that ledge is quite rich in sulphurets as well as in free gold.

THE HERCULEAN SOLD.—*Bedrock Democrat*, Aug. 7: Yesterday the sale of D. C. Probasco's interest in the Herculean mine at Cracker creek was recorded, the purchaser being A. H. Manning of San Francisco. This makes Mr. Manning the owner of two-thirds of the property. The transfer is an important event, for it carries with it the fact that a gentleman with sufficient means to fully develop the property and put up a mill is at the head of affairs. The Herculean will now take rank among the great properties of Baker county.

THE NEW EL DORADO.—Parties in from Cracker creek report that section as lively to a remarkable degree. About 75 men are now given steady employment at the Eureka and Excelsior mine, besides the hundreds of men now building houses and engaged in the various lines of trade. Any day in the week scores of teams can be met on the road either loaded with supplies or containing emigrants to that section.

UTAH.

REVIEW.—*Salt Lake Tribune*, Aug. 10: The week has seen the closing down of the Hanauer smelter, and so all the smelting operations in this valley are now stopped for the present. It is to be hoped that the railroad freights (the unsatisfactory nature of which is the open reason for the closing of the smelters) may be soon arranged on a better basis. The receipts in this city for the week ending Aug. 8th, inclusive, were \$47,993.02 in bullion and \$37,894.02 in ore, a total of \$85,887.04. For the previous week the receipts were \$88,349.09, of which \$50,888 was bullion and \$37,461.09 was ore. The Ontario product for the week was of bullion 22,178.05 fine ounces; from ore sales, \$20,875.93, an approximate total of \$43,054.08. For the month of July the Ontario product was 91,037.44 ounces of fine bullion, and \$56,616.98 from ore sales; an approximate yield for the month of \$147,654.42. The Daly output for the week was of bullion, 10,128.28 fine ounces; from ore sales, \$4634.49; a total, approximately, of \$14,762.77. For the month of July the Daly output was of bullion, 51,312.96 fine ounces; from ore sales, \$9948.82, an approximate total of \$61,261.78. The Horn Silver is dormant, both in Utah and New York. No ore product is reported. The base bullion receipts for the week were to the value of \$42,993.02. The Hanauer smelter produced during the week bullion valued at \$6200. Ore receipts in this city for the week were to the value of \$25,494.02 by Wells, Fargo & Co., and \$12,400 by McCormick & Co.

CAMP CROSSCUTS.—*Park Record*, Aug. 11: Work is progressing favorably at the mouth of the Ontario three-mile tunnel. Nearly all the necessary buildings are about finished, and Camp Florence is a scene of much activity. Work at the Rochester has been stopped for the present. The Anchor drain tunnel is now in about 4400 feet and the stretch of loose, wet ground having been passed, the work progresses more satisfactorily. It is just a year since work began and two-thirds of it is finished. The ledge in the Ontario, which the drift from the 1200-foot level in No. 2 shaft was run to crosscut, is showing up in such a way as to exceed the expectations of those most sanguine. As depth is attained the Ontario ledge increases in width, and assays from the ore taken out show that the richness of the mine is still there.

ORE AND BULLION SHIPMENTS.—Last Sunday the Ontario shipped 38 bars of bullion containing 19,960.24 fine ounces of silver. During the week the Crescent shipped 216,000 pounds of concentrates. The Ontario, Daly, Sappin and Apex shipped ore this week, but the amounts were not obtainable. On Tuesday 8 bars of Daly bullion, 8102 fine ounces of silver, were shipped from the Marsac mill, and this morning the shipment was 7 bars, 6499 fine silver ounces.

WASHINGTON.

CHEWELAH.—*Stevens County Miner*, Aug. 9: The mining outlook is much brighter than for a long time past, in fact, the showing on the claims of the district was never better. A strike in the Copper Chief has stirred up an action among the miners that makes the camp present an extremely lively situation. The vein of ore in the Copper Chief is five feet in thickness and assays already made prove \$320 silver to the ton. The Eagle mine, too, is looking far better as the work progresses. The production of ore from the Eagle this week far exceeds the output of the mine for any previous week since the mine commenced working.

BOUNDARY CREEK.—The Rock creek and Kettle river region is proving fabulously wealthy not only in gold and silver, but in copper. About 25 miles east of Rock creek there is a section of country now attracting the attention of mining men, that is rich in copper. It is not a simple indication as is many times the case with copper prospects, but there are immense ledges 12 feet thick of ore that will assay from 30 to 50 per cent copper, and even more than that, together with sufficient silver to pay the expenses of treating. Mr. Al. McKinney, who has been prominently identified with the mines of that region, was in the city last week. He had just returned from the headwaters of the Kettle river where these copper ledges are situated and pronounced them as equal, in value and class of ore, to anything in the shape of a copper deposit he has ever seen. The principal copper deposits in the new district are included in the claims known as the King Solomon, Copper Queen and the Bluebird. The ledge is fully one mile in length and crops out boldly upon the surface the whole length of this distance,

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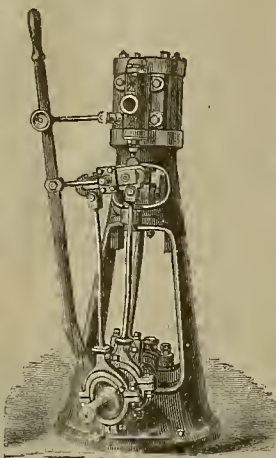
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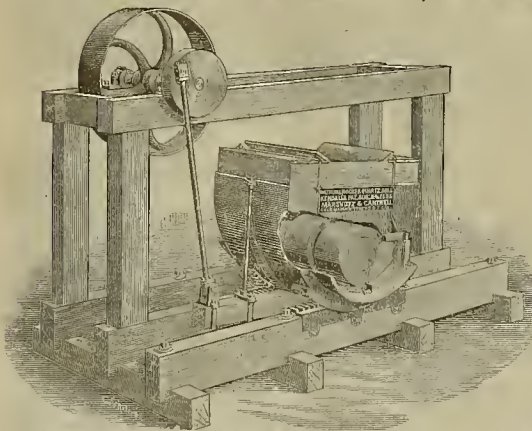
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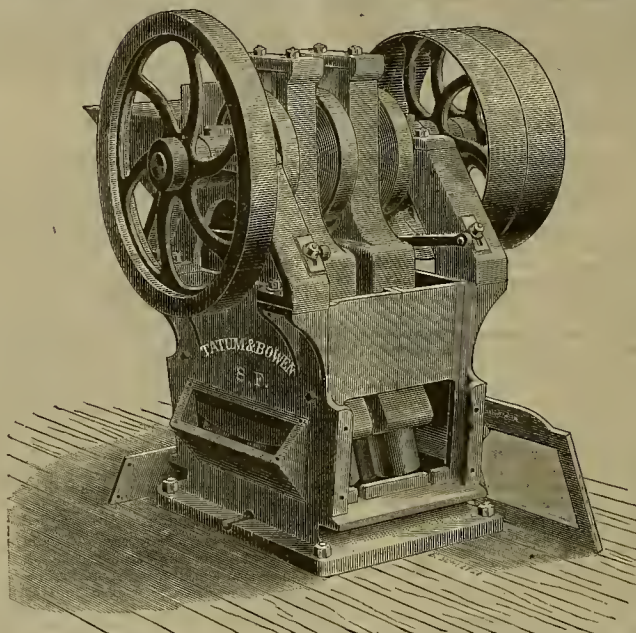
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Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

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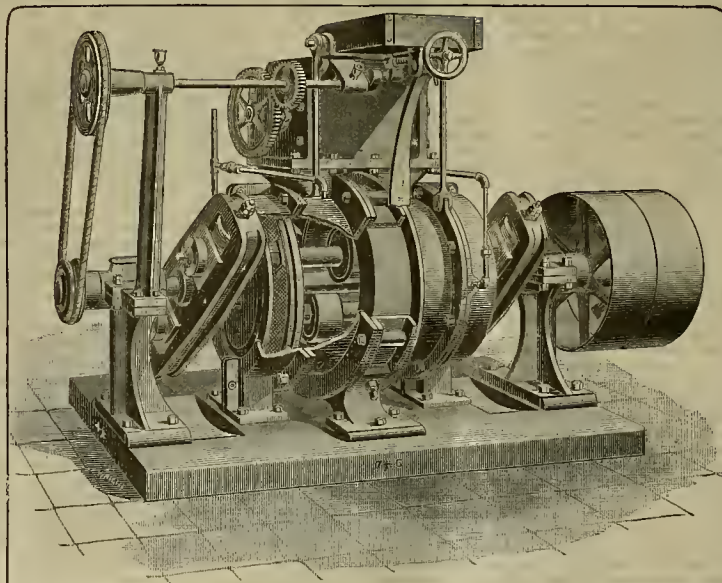
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FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.

**IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,**

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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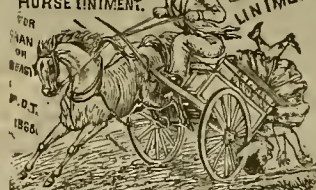
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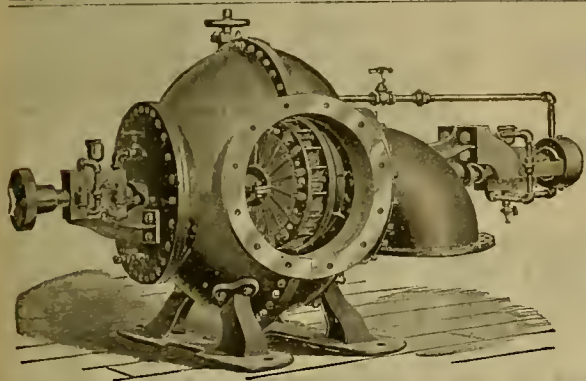
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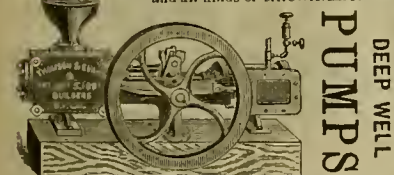
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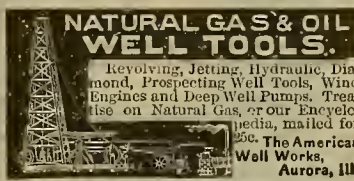
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 270 Market St., S. F.

FOR WEEK ENDING AUG. 7, 1888.

- 387,337.—SAW-FILING AND SETTING MACHINE—Bearsley & Perry, Eureka, Cal.
 387,339.—PURIFYING HYPOSULPHITE SOLUTIONS—R. D. Clark, Cortez, Nev.
 387,492.—EXTRACTING GOLD AND SILVER—R. D. Clark, Cortez, Nev.
 387,283.—ORANGE PICKER—C. Ducommun, Los Angeles, Cal.
 387,347.—AMALGAMATOR—A. H. Eysaman, Dayton, Nev.
 387,350.—TWO-WHEELED VEHICLE—Peter Glaszner, Redding, Cal.
 387,229.—SCREW PROPELLER—Hall & Sloan, S. F.
 387,230.—HORSE-CHECKING DEVICE FOR HARVESTERS—D. C. Hall, Stockton, Cal.
 387,356.—ROLLER-BEARING—R. W. Hent, S. F.
 387,590.—CONSTRUCTING RAILWAYS—C. H. Horne, Tucson, A. T.
 387,522.—DRAG SAW—J. B. Lalonde, Portland, Ogn.
 387,313.—MEDICAL COMPOUND—B. B. Motea, San Joaquin county, Cal.
 387,320.—TWO-WHEELED VEHICLE—J. A. Sneed, Marysville, Cal.
 387,459.—WHEEL-FASTENING DEVICE FOR CAR AXLES—A. J. Spicer, Portland, Ogn.
 387,326.—HARNESS FOR KICKING COWS—A. Sweet, Ferndale, Cal.
 387,603.—TURNABLE FOR CABLE R. R.—Chas. Vogel, S. F.
 387,330.—SPEED REGULATOR—Geo. F. Wells, S. F.
 387,477.—LOGGING-CAR—M. Wilbur, Seattle, W. T.
 387,613.—TREATING NATIVE SODA—L. F. J. Wrinkle, Virginia City, Nev.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HARNESS FOR KICKING COWS.—Alonso Sweet, Ferndale, Humboldt Co. No. 387,326. Dated Aug. 7, 1888. This is of the class of devices for keeping cows from kicking when they are being milked, and it consists in a strap passing around the body of the cow over the flanks and loins, and having secured to it a block which is pressed into the flank just in front of the hipbone. The object of this invention is to keep the cow from kicking by placing an obstruction before the hipbone, so that its movement is completely arrested.

SAW FILING AND SETTING MACHINE.—Wm. H. Bearsley and Bsthune Perry, Eureka, Cal. No. 387,337. Dated Aug. 7, 1888. This invention relates to the class of machines for filing and setting saws, and consists in the arrangement, construction and combination of certain frames forming ways or guides, the novel sliding and adjustable anvil on one side of the frames for setting the saw-teeth, and details of construction. The object is to provide a simple and readily operating machine for filing and setting saws.

SPEED REGULATOR.—George E. Wells, S. F., assignor of one-half to Manly C. Lawton, Staten Island, Ctl. No. 387,330. Dated Aug. 7, 1888. This invention relates to the class of devices for regulating the speed of engines, and especially motors designed for running small machines; and it consists in a bellows like frame operated by the engine or motor and having a regulating valve, and a brake connection from said frame to a portion of the engine or motor. The object is to provide a simple speed-regulator, delicate and noiseless, but effective in its operation, and which is, therefore, specially adapted for use in connection with motors designed for operation in automatic musical instruments where the speed has to be varied and controlled with so much accuracy.

TWO WHEELED VEHICLE.—Peter Glaszner, Redding, No. 387,360. Dated Aug. 7, 1888. This invention relates to that class of two-wheeled vehicles commonly known as "carts," and consists in the novel spring connection between the axle and the body, whereby the latter is permitted the required independence of movement to avoid having imparted to it the usual unpleasant motion due to the joggling of the horse; in the brake mechanism and its arrangements, whereby on a down grade the weight on the back of the horse is relieved; an adjustable strap connection of the front of the body with the crossbar of the shafts, whereby on an up grade the weight is thrown on to the horse's back; in the adjustable connections between the axle and the shafts, whereby the latter are regulated, and in details of the construction, arrangements and combination.

TWO-WHEELED VEHICLE.—James A. Sneed, Marysville, No. 387,332. Dated Aug. 7, 1888. This invention relates to the class of two-wheeled vehicles commonly known as "carts," and consists essentially in a novel, limited and ad-

justable hinge or pivot connection by which the axle is let into the structure, whereby the body is allowed an independence of movement and the vibratory motion of shafts is not communicated to the axle. It further consists in the construction, arrangement and combination of the axle, body, shafts and main springs, pivot connections, limiting springs and adjustable devices. Regarding the general structure of a cart, as comprising three main elements, namely, the shafts, the wheeled axle and the body, it is apparent that the connections between them cannot at any point be an unlimited hinge or pivot, for if the shafts were connected with the axle after the manner of four-wheeled vehicles the axle would turn, and, carrying the body with it, would precipitate the occupant. The result would follow if the body were simply hinged on the axle. Consequently it will be found that in the old style of carts the connections are all rigid, so as to afford stability, but it is plain that while safety is thus obtained it is at the expense of comfort, for the joggling of the horse is transmitted through the shafts to oscillate the axle, which in turn vibrates the body and causes that unpleasant forward and back motion to the occupant which renders carts so unpopular. There is between these extremes a middle course, which unites stability with comfort, and this course involves three things, namely, the joining the body of the axle by a limited yielding connection, the connection of the shafts in a similar manner, and the employment in the same vehicle of both connections.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

NORTH SEA TRADING CO., Aug. 9. Object, building, buying and selling vessels, ships and steamers for whaling, fishing, hunting and trading business in the Arctic ocean and elsewhere. Directors—N. Bloom, Alfred J. Marcus, Wm. Baneman, Milton A. Eisner and George W. Frank. Capital stock, \$35,000.

EUREKA IMPROVEMENT CO., Aug. 9. Capital stock, \$150,000. Directors—C. E. Knapp, F. M. Butler, C. E. Wilson, G. W. Sessions and Wm. W. Broughton.

WAREHOUSE LAND AND IMPROVEMENT CO., Aug. 10. Capital stock, \$200,000. Directors—Clark W. Crocker, Chas. H. Crocker, Jno. D. Yost, W. A. Sammarton and T. S. Mathewson.

WELSBACH INCANDESCENT GASLIGHT CO. of Oakland, Aug. 14. Capital stock, \$1,000,000 in 100,000 shares. Directors—H. L. Cope, C. M. Jennings, Simpson Tatis, J. L. Stewart, F. K. Shattuck and J. H. Smith.

GREENHORN CANYON G. M. CO., Aug. 14. Capital stock, \$100,000. Directors—R. R. Swain, E. K. Swain, F. A. Swain, J. S. Goodwin, M. T. Lawrence.

STOCKTON, FRESNO & SOUTHERN R. R. CO., Aug. 2. Object, building and equipping a narrow-gauge railroad 175 miles long over the following route: Commencing at Stockton and extending southeasterly through San Joaquin, Stanislaus, Merced and Fresno counties and through Tulare county to Visalia; also a branch line to Fresno. Capital stock, \$3,500,000. Directors—Henry L. Davis, H. B. Hunt, Thos. R. Hayes, A. T. Murvey, Daniel E. Hayes, George H. Collins and L. M. Hickman.

Mining Share Market.

The stock market continues dull and inactive, a record which has now been kept up for a long time. Even on the Comstock affairs are dull, but the faith of the people there is not abated. Preparations for the prosecution of work in all the mines are as elaborate and thorough as they have been at any time for the last 10 years. The tendency of their researches and endeavor is to reduce ore cheaper, and ever cheaper. Every dollar per ton saved in the reduction of ore brings millions upon millions to be made at the business within the profitable range of reduction. The Virginia Chronicle says: Arrangements whereby enough more water-power may be obtained to operate 20 additional stamps in the Nevada mill, by the Pelton wheel, are under consideration pending the delay in the introduction of the electric motor-power. The grade of Hale and Norcross are so far crumbed the current month has averaged over \$48 per ton by pulp assay. With this grade, the hullion yield of the mine can be maintained at a dividend-paying basis, with the additional 20 stamps added to the present crushing-power.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Nevada Queen, Aug. 13, \$18,000; Mt. Diablo, 13, \$4638; "Work Your Own Diggings," 10, \$4000; Overman, 10, \$6200; Confidence, 11, \$17,870; Grand Prize, 14, \$17,933; Cons. Cal. and Virginia, 11, \$37,008; Hale and Norcross (for August), \$86,799.

The Fresno syndicate bought recently 9000 tons of Japanese copper out of a total estimated annual production of 10,500 tons, with the option to the syndicate of taking a similar quantity for a further period of two years.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.		
Baltimore M Co.	Nevada.	2.	25.	June 30.	Aug. 1.	Aug. 22.	W W Tenney.	402 Montgomery St.
Belcher M Co.	Nevada.	31.	50.	July 18.	Aug. 22.	Sept. 12.	Crockett.	327 Pine St.
Bullion M Co.	Nevada.	34.	50.	Aug. 4.	Sept. 7.	Sept. 24.	R R Grayson.	327 Pine St.
Bute Divide M Co.	California.	15.	25.	Aug. 13.	Sept. 17.	Oct. 8.	D M Kunt.	340 Pine St.
Chollar M Co.	Nevada.	25.	10.	July 20.	Aug. 23.	Sept. 11.	C E Elliott.	309 Montgomery St.
Champion M Co.	California.	31.	10.	Aug. 8.	Sept. 10.	Sept. 29.	T Wetzel.	522 Montgomery St.
Foundry & Machine Co.	Nevada.	3.	62.	July 12.	Aug. 17.	Sept. 7.	J Stadfeld Jr.	309 Montgomery St.
Great Eagle M Co.	California.	8.	65.	July 7.	Aug. 11.	Aug. 31.	T Wetzel.	324 Montgomery St.
Great Western Q M Co.	California.	13.	4.00.	July 31.	Sept. 8.	Oct. 1.	A Halsey.	328 Montgomery St.
Golden Field G M Co.	California.	42.	50.	July 21.	Sept. 3.	Sept. 25.	W J Gleason.	806 Market St.
Keyes S M Co.	Nevada.	2.	50.	July 15.	Aug. 23.	Sept. 23.	M P Minor.	328 Montgomery St.
Lone Jack M Co.	California.	2.	10.	July 11.	Aug. 16.	Sept. 7.	J J Scoville.	309 Montgomery St.
Mayflower Gravel Co.	California.	42.	50.	July 21.	Sept. 3.	Sept. 25.	J Morillo.	338 Montgomery St.
Mexican M Co.	Nevada.	36.	25.	Aug. 9.	Sept. 13.	Oct. 3.	O E Elliott.	309 Montgomery St.
Navajo Queen M Co.	Nevada.	1.	20.	Aug. 3.	Sept. 5.	Sept. 24.	J F Holling.	533 Kearny St.
Potosi M Co.	Nevada.	20.	50.	July 13.	Aug. 16.	Sept. 5.	C E Elliott.	309 Montgomery St.
Pondere M Co.	Nevada.	1.	05.	Aug. 10.	Sept. 12.	Oct. 10.	J Stadfeld Jr.	309 Montgomery St.
Over King M Co.	Arizona.	1.	50.	June 22.	July 30.	Aug. 23.	J Nash.	328 Montgomery St.
Scott Bar M Co.	California.	5.	10.	July 26.	Sept. 3.	Sept. 20.	W Richardson.	218 California St.
Sierra Nevada M Co.	Nevada.	92.	25.	July 10.	Aug. 14.	Sept. 1.	E L Parker.	309 Montgomery St.
Spring Valley G M Co.	California.	3.	10.	July 19.	Aug. 25.	Sept. 24.	H Pichor.	320 Sansome St.
Savage M Co.	Nevada.	3.	50.	Aug. 3.	Sept. 8.	Sept. 25.	E B Holmes.	309 Montgomery St.
Union M Co.	California.	35.	05.	July 5.	Aug. 7.	Aug. 25.	K Hancock.	309 Grass Valley St.
Venus M Co.	California.	3.	35.	July 3.	July 31.	Aug. 20.	J Calver.	152 Fourth St.
Western Mineral Co.	California.	2.	1.00.	June 21.	July 30.	Aug. 20.	A Chemerant.	328 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Booker M Co.	Nevada.	C W Sessions.	309 Montgomery St.	Annual. Sept 4
Con Pacific M Co.	California.	F E Luty.	339 Pine St.	Annual. Aug 18
Fisher M Co.	Nevada.	F F Holling.	533 Kearny St.	Annual. Aug 21
Front Range M Co.	Nevada.	O Everett.	401 California St.	Annual. Aug 21
Independence M Co.	Nevada.	J W Pew.	310 Pine St.	Annual. Aug 20
Maryland M Co.	California.	L V Dorsey.	Grass Valley.	Annual. Aug 28

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	50.	Aug 10
Confidence S M Co.	Nevada.	A S Groth.	306 Pine St.	1.00.	Aug 6
Eureka Con M Co.	Nevada.	H R P Hutton.	306 Pine St.	25.	July 9
North Belle Isle M Co.	Nevada.	J W Pew.	310 Pine St.	50.	May 7
Over King M Co.	Nevada.	D A Jennings.	309 Montgomery St.	50.	Aug 8
Hale & Norcross S M Co.	Nevada.	J F Lightner.	309 Montgomery St.	50.	July 11
Idaho M Co.	California.		Grass Valley.	50.	July 11
Pacific Borax, Salt & Soda Co.	California.	A H O'Leary.	230 Montgomery St.	1.00.	July 10
Standard Con M Co.	California.	J W Pew.	310 Pine St.	65.	June 12

San Francisco Metal Market.

WHOLESALE.

THURSDAY, August 16, 1888.

ANTIMONY—French Star.	9 @ 9 1/2
BORAX—Refined.	— @ —
Powdered.	— @ —
Concentrated.	6 1/2 @ —
COPPER.	
Bolt.	26 @ —
Sheeting.	26 @ —
Ingot.	— @ 26
Fire Box Sheet.	— @ 26
IRON—Glengarnock ton.	— @ 28 50
Eglington, ton.	— @ 27 00
American Soft, No. 1, ton.	— @ 31 00
Oregon Pig iron.	21 @ 23 00
North Star M Co.	— @ 23 00
Shotts, No. 1.	— @ 29 00
Bar Iron (base price) @ lb.	21 @ —
LEAD—Pig.	5 00 @ —
Bar.	6 25 @ —
Sheet.	7 @ —
Pipe.	7 @ —
Shot, discount 10% on 500 bag.	1 55 @ —
Buck, # 14.	1 75 @ —
Obilid, do.	16 @ 20
SEAL.	10 @ 16
Black Diamond tool.	10 @ 16
Pick and Hammer.	8 @ 10
Machinery.	4 @ 5
Ten Calk.	5 75 @ 6 50
TELEGRAPHIC.	6 75 @ 7 25
Charcoal.	38 50 @ 40 00
QUICKSILVER—By the flask.	1 05 @ —
Flasks, new.	85 @ —
Flasks, old.	85 @ —

New York Metal Market.

Telegraphic advices dated Aug. 16th give the following New York prices:

BAR SILVER—02c per oz.	
BORAX—3c.	
COPPER—LARK—\$10.70	
Iron—No. 1, \$22.00	
LEAD—\$4.40c	
TIN—\$21.00c	

The following is the latest by mail from the "New York Metal Exchange Market Report":
 COPPER—Steady, spot closing at \$18.75@19.00. Transferable Notices (Lake) issued at \$16.50@17.00.
 LEAD—Firm, at \$4.30c—spot. Transferable Notices issued at \$4.00@4.15.
 TIN—Irregular at \$20.40@20.45.
 Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery.
 Australian Tin, @—; Billiton Tin, @—; Banca Tin, @—; Baltimore Copper, \$14.75@15.00; Orford Copper, \$15.00@15.25; P. S. G. Copper, @—; Foreign Lead, \$8.60@8.75; Foreign Spelter, \$5.40@5.50; Antimony, \$9.75@13.50.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Sampling Works for Sale.

The works are situated on A. & P. R. R., Calico Mining District, Daguerre, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Platform Scales, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPIE & CHILDS, 123 California street, San Francisco.

THE University Regents have complied with Prof. Holden's request and provided funds for observing the total eclipse of the sun which occurs Jan. 1, 1889. It will not be total at Mt. Hamilton, but will be near Bertlett Springs, and observations will be made there.

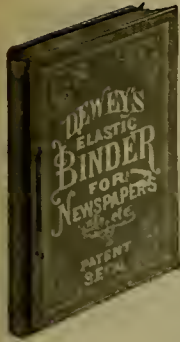
The tin mines on Admiralty Island, 100 miles south of Douglas Island, Alaska, are said to have been sold to an English company for a very large price.

McINTOSH's sampling works, at Sandy, Utah, were destroyed by fire this week.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING July 26.	WEEK ENDING Aug. 2.	WEEK ENDING Aug. 9.	WEEK ENDING Aug. 16.
Alba.	1.75	1.91	1.75	1.55
Alta.	1.50	1.60	1.40	1.25
Andes.	1.15	1.25	1.15	1.00
Argenta.	3.65	4.00	3.65	3.70
Best & Belcher.	3.60	4.25	3.90	3.35
Bullion.	1.15	1.25	1.15	1.00
Baltimore.	40.	45.	35.	30.
Belle Isle.	2.00	2.20	1.85	1.60
Bodie Con.	2.00	2.20	1.85	1.60
Benton.	2.00	2.20	1.85	1.60
Bodie Tunnel.	75.	80.	75.	70.
Bulwer.	75.	80.	75.	70.
Con. Va.	1.10	1.20	1.10	1.00
Challenge.	5.25	5.75	5.00	4.25
Champion.	3.00	3.25	3.00	2.75
Chollar.	2.80	3.00	2.75	2.50
Confidence.	1.75	1.91	1.75	1.55
Copied.	45.	50.	45.	40.
Caledonia.	40.	45.	40.	35.
Con. Pacific.	4.15	4.40	4.00	3.75
Crown Point.	1.10	1.20	1.10	1.00
Crocker.	30.	35.	30.	25.
Con. Va.	1.10	1.20	1.10	1.00
Dudley.	35.	40.	35.	30.
East B. & B.	1.00	1.10	1.00	0.90
Eureka Con.	1.10	1.20	1.10	1.00
Exch. & M.	2.35	2.65	2.20	2.00
Grand Prize.	2.40	2.60	2.30	2.10
Gould & Curry.	2.40	2.60	2.30	2.10
Hale & Norcross.	5.75	6.10	5.50	5.10
Holmes.	1.10	1.20	1.10	1.00
Idaho.	1.10	1.20	1.10	1.00
Justice.	1.05	1.10	1.05	0.90
Kontuck.	1.75	1.91	1.75	1.55
Lady.	30.	35.	30.	25.
Martin White.	1.30	1.40	1.25	1.10
Mono.	3.40	3.90	3.40	3.00
Mexican.	3.40	3.90	3.40	3.00
Mt. Diablo.	1.10	1.20	1.10	1.00
Northern Belle.	1.50	1.60	1.45	1.35
Navajo.	1.50	1.60	1.45	1.35
North Belle Isle.	3.25	3.60	3.30	2.90
Nevada.	6.00	6.25	5.75	5.40
Occidental.	1.50	1.60	1.45	1.35
Ophir.	4.25	4.60	4.40	4.00
Potosi.	1.75	1.91	1.75	1.55
Overman.	2.70	2.90	2.60	2.40
Peerless.	1.75	1.91	1.75	1.55
Perr.	60.	65.	60.	55.
P. Sheridan.	3.00	3.25	3.00	2.75
Silver Star.	3.00	3.25	3.00	2.75
Savage.	3.00	3.25	3.00	2.75
S. B. & M.	3.40	3.90	3.40	3.00
Sierra Nevada.	3.10	3.40	3.10	2.80
Silver Hill.	55.	60.	50.	45.
Silver King.	1.25	1.40	1.25	1.10
Sierra.	65.	70.	65.	60.
Syndicate.	3.20	3.50	3.20	2.90
Union Con.	3.20	3.50	3.20	2.90
Utah.	1.30	1.45	1.30	1.15
Yellow Jacket.	3.35	3.60	3.35	3.00

Sales at San Francisco Stock Exchange.



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The Solano Times says: The Mohican has been hauled alongside the yard, where her baling will be removed. There is some talk of taking out two of her six boilers to increase the ship's capacity for carrying coal, and also of shifting the smokestack, as it burns the rigging.

REMEMBER.—We can make it an object for some friend desiring first-class passage at a low rate to this East to consult us before buying tickets.

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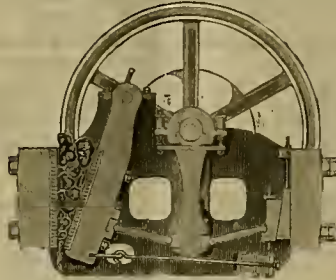
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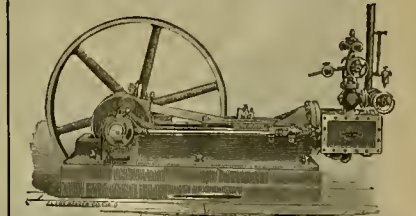
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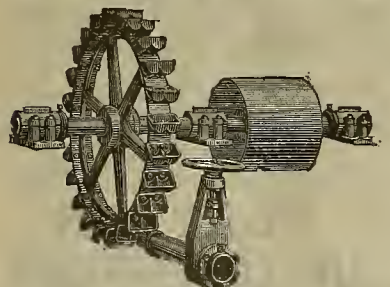
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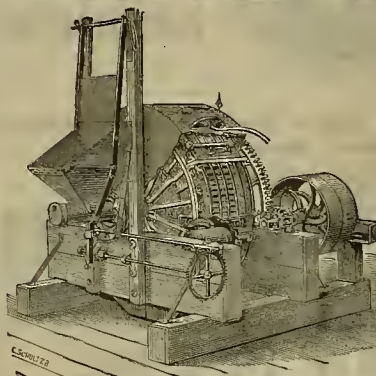
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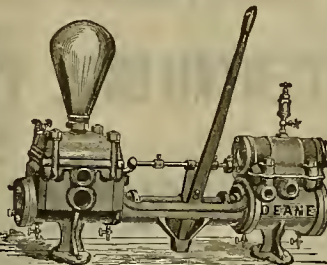
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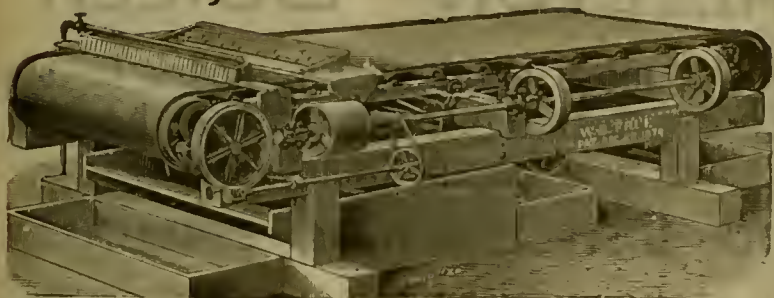
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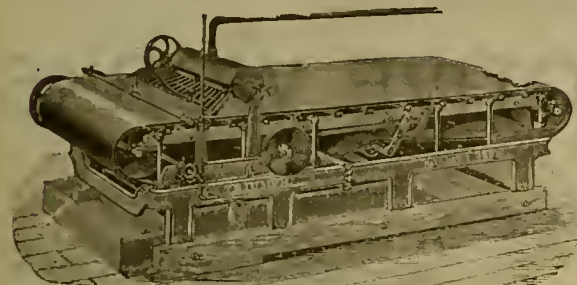
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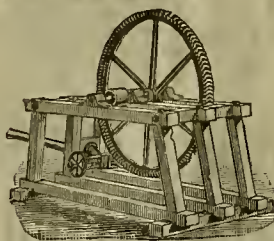
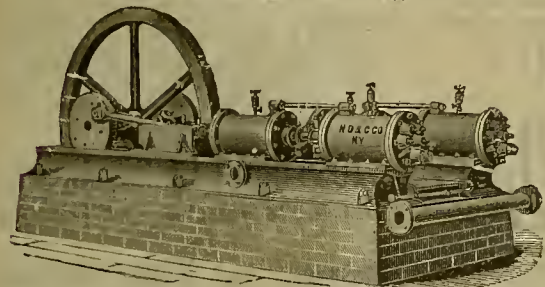
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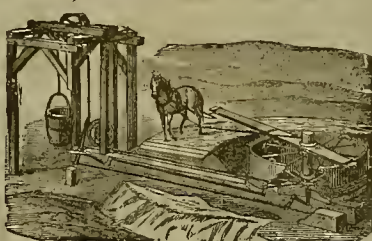
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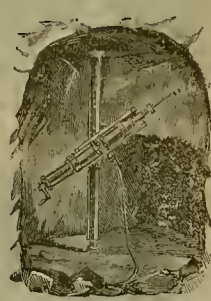


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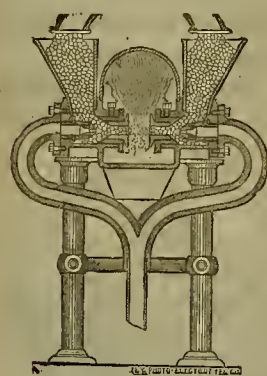
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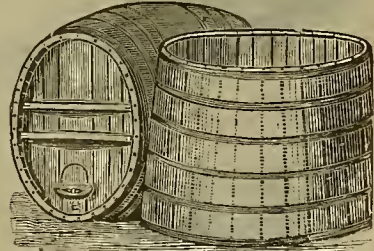
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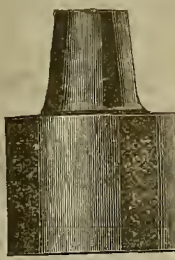
In respect to capacity, INSPEED OF DRILLING, perhaps it is in order to say that in EVERY AUTHORITATIVE CONTEST for speed yet initiated, the RAND DRILLS have, without exception, BEEN VICTORIOUS. This fact, coupled with another important one, that the drills use much LESS AIR and cause LESS REPAIRS, has won for them nearly all of the Eastern mining trade, which has kept their works always busy.

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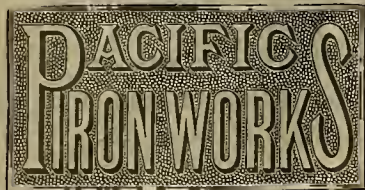
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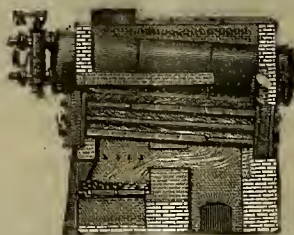
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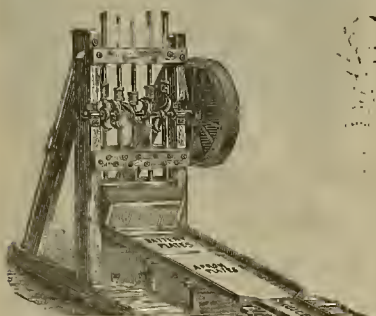
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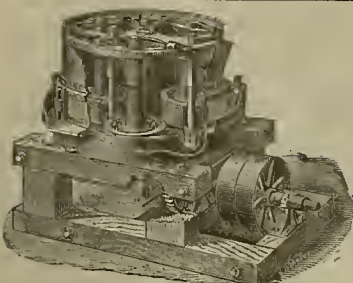
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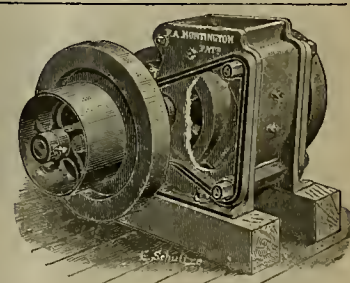
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, AUGUST 25, 1888.

VOLUME LVI.
Number 8.

A Quadruple Compound Engine.

A practical working test was made last week of a quadruple expansion marine engine recently completed at the Fulton Iron Works, in this city. The engine was built for the coasting steam schooner Michigan. On the trial trip of the vessel, with 180 pounds pressure, the engine making 104 revolutions, 10½ knots were logged. The engine started off just the same as an ordinary one, with no difficulty and no "hitches" of any kind. The vessel is 162 feet long, 34 feet beam, and 12 feet depth of hold.

This is a new departure in steam engines. It is the first quadruple expansion engine ever built on this coast, and the second ever built in this country. The first one was tried on a steam launch in the East, but for regular trade work this one is practically the first.

The engraving on this page shows the new engine. The four cylinders are coupled in Z form. The steam enters the first cylinder at the right hand on top, and then goes to the left-hand upper one. It then passes into the lower right-hand one and thence to the left lower one. The cylinders are respectively 11, 14½, 20 and 32 inches; stroke 24 inch. The engine stands, complete, about 15½ feet high. There is one boiler 10 feet in diameter and 9 feet 6 inches long. It contains two corrugated furnaces 40 inches in diameter. It is the ordinary compound type of boiler. The shell is made of steel 1½ inch thick. This boiler is the same size employed with a smaller engine, nevertheless it keeps up steam with the greatest ease in this engine, while with the smaller compound engine the boiler had all it could do to supply the proper quantity of steam.

This is the most forward step ever taken in this country in marine engines. Tripling the compounding is now common, especially on large ocean-going steamers, but this is the first time the quadruple has been employed on a large vessel. The quadrupling was done in order to gain economy in the use of steam, and the result has proved highly satisfactory. It is now known that there is not much economy in trying to expand in one cylinder. The higher the pressure, the more cylinders are required to get the full benefit of the steam-power.

It was about 20 or 25 years ago when compound engines began to displace the single-cylinder type. Then about 10 years ago the triple cylinder was introduced and its use has gained rapidly. Now, within the past two years the quadruple has been introduced abroad.

Just as the compound took the place of the old-style marine engine that preceded it, so the triple expansion is rapidly supplanting the single compounds of 10 or 20 years ago. Advanced engineers and the makers of this engine believe that the quadruple expansion engine will, inside of a few years, replace the triple, as the triple did the single compound. In fact there may be five cylinder engines before long.

With steam of high pressure, up to a certain point, the more cylinders the more utility. The economy in the use of steam advances just as the pressure increases in a certain ratio. With four cylinders nearly all the power of the steam is utilized with direct results in economy. This engine was designed at the Fulton Iron Works, and is built on well-recognized principles. These works have for some years made a specialty of marine work, and have kept up with modern improvements. In this case they have made a marked advanced step.

A MARINE DISASTER.—On Wednesday morning the incoming China steamship Oceanic and the outgoing Eureka steamship City of Chester collided in a fog off Lime Point, at the entrance of San Francisco bay, and the latter vessel was sunk.

THE BIG BEND TUNNEL.—At the Big Bend tunnel, Butte county, they have had a great deal of trouble with their electric plant, and many changes had to be made, but there is nothing but what can be remedied. In time all

Mine Surveying.

The importance of thorough and accurate surveys of mines is not so generally realized as it should be. In our very large mines careful underground surveys are made and kept for constant reference, but there are many important mines that trust to a sort of rule-of-thumb for record of work. The most extensive and accurate mine surveys are those of the collieries of Pennsylvania and the metaliferous mines of the Hartz. It cannot be said, however, in this country or abroad that mine surveying has kept pace with the advances in other branches of surveying, for it is to be regretted that in many cases mine surveys are still made with instruments which have long since been set aside as too inaccurate for surveys above ground, although the latter rarely present such serious difficulties as are encountered under ground.

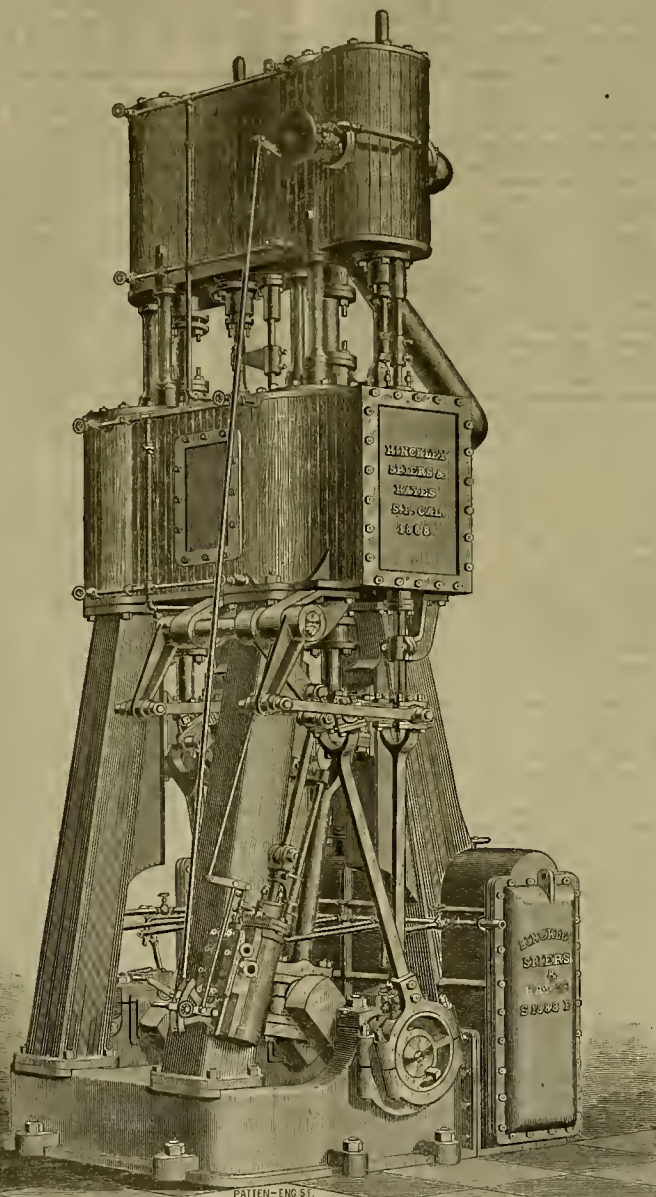
In Great Britain this is, in part, due to the conservatism of miners—a conservatism which has frequently led them to regard with contempt every kind of knowledge except that learned under ground. As a rule, the untrained mind treasures every truth as a mystery, to be carefully guarded for individual use only. Experience has often stored an individual mind with useful facts which are rarely recorded. The miner trusts to his memory, and when he dies the results of his experience die with him. These remarks apply particularly to Cornwall, where the mining proverb "Where it is, there it is," still holds its own.

Another cause which has retarded the progress of mine surveying is the uncertain and speculative nature of mining. Casual failures caused by the want of easily accessible information frequently lead to the abandonment of highly promising mines. Mining, though speculative, is by no means entirely the work of chance, and he who, avoiding vague and unsatisfactory speculation, constantly stores up facts, and can grasp the extent and object of mining works, is frequently enabled to avoid expenses and difficulties in which those who are without such data would soon be involved.

The branch of surveying especially applied to mining consists in measuring, with a view to subsequent delineation on a plan and sections, first the underground workings of a mine, and, secondly, the mine buildings at the surface, etc. Thirdly, it requires an accurate method of connecting underground and surface surveys. Trustworthy plans and sections are of value for giving a condensed view of all the facts connected with the works and explorations of a mine; for affording data to assist in the further prosecution of workings after temporary abandonment, and for the avoidance of litigation, trespass, loss caused by driving in the wrong direction, etc., which have too often resulted from incorrect or imperfect mine plans.

A short time since J. B. Lippincott & Co. of Philadelphia published an excellent treatise on "Mine Surveying," written by Bennett H. Brough, instructor in mine surveying at the Royal School of Mines, London. It is a very useful work for mining engineers and superintendents, containing about all that is necessary to be known on the subject. The book only costs \$2.50 and is well illustrated.

The contract for the erection of the Nevada Queen and Commonwealth mill at Tuscarora has been let to the Union Iron Works of San Francisco.



QUADRUPLE COMPOUND ENGINE BUILT BY THE FULTON IRON WORKS.

in 50 fathoms of water. Fifteen people were drowned, including some women and children. The question of the responsibility for the accident will be decided by the Government Inspectors. The City of Chester was valued at \$150,000, and her cargo was worth about \$5000. The Oceanic was but slightly injured.

It is said that the drill in an oil-well at Oil City, Southern California, has struck gold-bearing gravel at a depth of over 500 feet.

will run smoothly. The difficulty with the electric plant has retarded work this season.

At the annual meeting of the stockholders of the Independence Mining Co., the following officers were elected for the ensuing year: E. Scott, president; F. A. Berlin, vice-president; T. J. Shackelford, H. H. Pitober and J. W. Pew, trustees. J. W. Pew was re-elected secretary, W. C. Price superintendent and the Anglo-Californian bank treasurer.

The Achievements of Mechanics.

Skilled Labor in California and Its Results.
[An address delivered at the opening of the Mechanics' Institute Fair by Robt. S. Moore, superintendent of the Riedson Iron Works.]

It is now 33 years since this Mechanics' Institute was organized. It is but 38 years since this—the State of California—was admitted to the Federal Union. I think of what we, the mechanics of San Francisco, have achieved in this direction of lifting ourselves and our occupations to a higher level, with great satisfaction. I look abroad over the State in which we live, over the land in which our destinies have been cast; I reflect upon the conditions surrounding us, the wages we receive, the opportunities we enjoy, the education we have acquired, and that afforded for our children, the dress we are enabled to wear, the food we consume, the dwellings in which we live, the social circles in which we move, and thank God our lot is cast in so delightful and so prosperous a land.

I look over this most respectable audience owning its spacious hall, in which it makes yearly exhibits of the handicraft of its members; over the faces of the mechanics' children sparkling with bright intelligence; I reflect that all adult mechanics are units of a great and splendid Government, each workman the equal and the peer of every other man in the Republic, and I am rapt in the presence of the Divine Author of all these most generous and snubbing gifts, and I thank Him that our lot has been cast in an age so advanced and a country so supremely blessed.

When I consider all these things I say to myself—and I have the right to remind you—that these gifts and opportunities are attended with responsibilities and duties from which we have no right to attempt to escape or endeavor to avoid. The first and greatest of these must ever be the necessity of loyalty to the Government and obedience to the law. Loyalty to the Government because it is ours; because under it all men are free, all are equal, all born upon the soil and legally naturalized are clothed with the electoral privilege; all are sovereign; the Government was created by labor, carved by toil from primal wilderness and virgin prairies; toilers, and the sons of toilers, fought the war in which its independence was achieved, built the national structure, developed in legislative halls its splendid constitutional fabric, fought its conflict for the emancipation of slaves and for the preservation of the American Union, and stand to-day the guardian of its freedom and the bulwark of its priceless liberties.

We must obey the laws because we make them. The majority of the American people are laborers—laborers with brain and muscle; more with muscle than brains, more at the plow and work-bench, and toiling with their hands, than in all other occupations beside. The majority rules the republic under laws made by it. We are the majority, and if we do not respect and obey the laws, who shall? If capital infringes the law, we have the right to correct it. If labor, ignorant, misguided and criminal, attempts to overturn the laws, we, the majority within the ranks of labor, must discipline and control it.

The first guiding principle, the cardinal underlying rule of every labor organization, the first thought of every mechanic's mind, ought to be unquestioned obedience to the law. If the laws are wrong, tyrannical or oppressive, it is our fault, for we, if we have not neglected our duties and our opportunities, have made them. If they are imperfectly or corruptly, or in any way badly executed, we are to blame, for we have elected, or had the opportunity to elect, the officials who execute them. There is no safe way of amending or repairing bad laws except by legal modes; riots are never excusable; anarchy is a crime; communism is indefensible. Under the structure of our organization, where all are equal, all sovereign, and the majority makes the law and executes it, it follows as an inextinguishable, logical conclusion that if laws are bad and badly administered, it is the fault of the majority which makes and executes them, and of that majority the intelligent, skilled mechanics and workmen of the nation are the most responsible.

The cry against capital is not half a truth because the great bulk of the nation's vast wealth is owned and enjoyed by the working forces which created it. Wealth is the slave of labor. Gold is of no value while piled in vaults unused; it is worthless. It cannot be moved, or used, or enjoyed, except at the will of labor, and when it moves it earns more for the man who handles it than for the man who owns it. Labor is the master, capital the indispensable, if not the always willing slave. It has some advantages—it may sulk, it may run away, it may refuse to be used; it may hide itself in vaults of steel which we have been paid to make fire and burglar proof. Hence it is policy that we should make for its protection, just laws, treat it kindly and generously, as all masters should treat their most valuable servants.

Again, proud as we all are of labor, dignified and honorable as we concede it to be, let none of us be so dishonest and hypocritical as not to admit that we would prefer to be millionaires rather than working mechanics. Some time since a weekly journal of San Francisco published the names of 107 millionaires resident in this city, not one of whom was not a poor and toiling boy, not one of whom was the graduate of a learned university. All had come from the farm, the workshop, and the humbler walks of working life. Wealth, like the higher prizes of life, is open to the well-directed efforts of our

boys in this splendid empire of opportunity, and in this age most blessed.

This is not a fitting occasion for the introduction of political questions of a partisan character, for there must be times and places where these matters of consideration are of higher and broader importance than what we regard as mere partisan questions; but there is no time and no place where mechanics and skilled laborers can meet when it is not appropriate for them to deliberate on what concerns themselves, their families and their future. What promotes and aids labor aids them. What pertains to the rights of labor concerns them. That which dignifies labor gives them dignity. Political power and authority give to them weapons for aggression and an armor for defense. These weapons and this armor should never be used except in the right, seldom, if ever, except in self-defense under the law. When oppressions become unendurable, and wrongs irremediable, by any legal course of action, then comes the right of revolution and rebellion against the unjust exercise of arbitrary power. This we will not now consider.

How to protect ourselves and how best to promote our own interests without invading the rightful privileges of others, or trespassing upon rights guaranteed to others by law, should be matters which we should most carefully consider. This land of America is ours, and it must be preserved for us and as the inheritance of our children. Those who are born upon its soil, those who have become citizens by legal adoption, those who are on their way to citizenship through the courts, are equally entitled to all the rights and privileges incident to American citizenship. There can be organized no political party in which all should not have the privilege of membership, voice and equal participation. There should be no question in the consideration of which the workingman's intelligence should not be consulted, his selfish and disinterested advice listened to, and his wise admonitions heeded, but there should be no political question which Americans should not openly discuss.

The question of tariff for the collection of revenue for the support of Government, and incidentally for the protection of American industries, the question of foreign immigration, and to what extent it may be regulated and limited—the discriminations which may be made for or against different nationalities and different classes—are properly within the lines of political consideration, and there can be no doubt, I think, that the Government of the country has the unquestioned right to determine to what extent foreign immigration may be limited and what undesirable nationalities or classes may be entirely excluded from the privilege of residence upon American soil. There can be no doubt of the authority of the Government of the United States to determine whether it will further extend the privilege of the elective franchise and whether it will clothe any more men of foreign birth with the sovereignty of citizenship; whether it will not deem it prudent to preserve all that remains of its public domain as the heritage of its increasing native-born millions; whether the principles which govern the educational system, so generously charged with free instruction at the expense of the State, of the sons and daughters of the working families of the nation, should in any respect be changed, and whether there should be encouraged or permitted the establishment of any religious denominational or church power or ecclesiastical system, Protestant or Catholic, Church of Rome, Church of Jerusalem, Church of England or Church of America, drawing funds from municipal, State or National treasuries within the jurisdiction of a republic, whose organic and fundamental law declares that in this commonwealth there shall be no connection between Church and State.

We look upon England as a country of wise legislation in this respect, and its Church has, by an English Parliament, within the generation, been disestablished in Scotland and Ireland, while the extension of the principle to Wales and England is now a matter of grave consideration. All these questions come properly within the scope of consideration by intelligent mechanics, because we, in common with all citizens, are charged with the responsibility of ultimate decision.

When all these matters are contemplated, and the condition of the American mechanic deliberately considered, if any one in the United States of America shall ask, is labor honorable and dignified? let the answer be: The Creator of the Universe was an architect and builder; His only Son a carpenter; the first created man, a gardener and fruit-grower; the apostles, fishermen, the patriarchs, herdsmen; the first navigators, those legendary argonauts searching for the golden fleece; the early explorers pushing beyond the pillars of Hercules till they discovered America, circumnavigated the globe, found the entrance of the Golden Gate to our golden shores, and exposed India to the commerce of the world, were sailors. Peter of the great Dynasty of the Romans who laid the foundation of a colossal northern Empire, was a shipbuilder; William, the conqueror of England, married a tanner's daughter; Franklin was a printer; Washington a surveyor; the immortal Lincoln, who preserved the nation that is ours, was a rail-splitter; and Grant, the hero, who fought the battles that preserved the integrity of our nation, was the son of a tanner and himself a toiler.

The skilled mechanics and artisans, to whom and for whom I this day speak, do not suffer

by comparison with any composing the human family in intelligence, morals, patriotism; they compare favorably with the best, harvest and most useful of mankind. May we not in our pride say they are the very foundation of Christian civilization? May we not claim, and justly, that without the aid of the practical working mechanic the refinements of Europe would still be left with art, science and literature undeveloped; that except for the skilled artisans America would remain to-day an undeveloped land, peopled with red men clothed in skins, living in caves and running wild in the primal forests where they were born, and from which they would have no hope of deliverance.

While we consider the progress of the age and the nation we may not be unmindful of the fact that the inventors, mechanics and business men of California have not been deficient in their contributions of useful gifts tending to promote the welfare and add to the material comfort and intellectual advancement of the age. Our State of California, lying on the outer border of our National domain, has been linked with steel to our Eastern homes, and now the iron horse, feeding upon coal, and breathing fire, carries us dashing over mountains and across plains, leaping broad streams and deep ravines, till space is almost annihilated. California enterprise, and the daring of its pioneers, have achieved the engineering marvel of the century by crossing the continent by rail.

The skill and ingenuity of a San Francisco mechanic has given us the invention of wire cable, and its applications to street transportation, till, for the purpose of residences and business, our hills are level with the valleys, and our suburban homes so closely and so cheaply connected with our shops and places of business, that none but the men of means and leisure can afford the luxury of walking to and from their daily occupations. The street-car and dummy is the poor man's carriage, cheaper and more safe, more comfortable and more expeditious than the rich man's coach.

San Francisco will, within a few days, send an iron-clad Leviathan to the great deep, flying the American flag at her mast-head, evidencing the skill of her mechanics and the resources of the Pacific States. The "Charleston" with her frowning batteries of defense (never to be used, we hope, in aggressive, unjust wars), will, so long as she floats, evidence the fact that our inter-oceanic empire is defensible by the mechanical skill and patriotic courage of its sons of either shore. From Mt. Hamilton, through cloudless heavens that arch its summit, scholarly mathematicians are studying the courses of the stars as they move through the firmament of boundless space, and solving the sublime mysteries of the universe through a telescope more powerful and more perfect than elsewhere exists, the contribution of a California mechanic to the science and learning of the world.

Almost at the foot of Mount Hamilton, there grows a great university of learning, now and hereafter to be more richly endowed than any college resting upon imperial or royal benefices. A university where mechanical instruction will be provided for boys and girls, and from which the sons and daughters of no respectable person will be excluded, thus acknowledging the equal rights of all who are gleaners in the great field of human knowledge, of all who are workers and toilers in their endeavor to penetrate the mysteries of the boundless universe of human research.

Let us then be justly proud of our calling and our Order, proud of our rank among the useful classes. Let us bravely assert our power under the law and within the law and according to law, to preserve ourselves, our country and our children from the encroachments of foreign invasion, from ignorance, superstition, idleness, drunkenness and crime, and from the slavery from which any tyranny, ecclesiastical, civil or political, would endeavor to bind us. Let us fear and avoid the tyranny of ignorance, by sending our children to kindergarten schools, where they may play at acquiring the rudiments of education, then to the public schools, where they may be equipped in their intellectual armor of mental and moral defense. Let us demand for them proper legislation and apprenticeship, and let us so teach them in religious and political principles at our own homes and by our own firesides, that we may send them forth fully panopied for their own defense in the struggle of life, and fully equipped to fight successfully the battles in which Americans must of necessity be involved. Let us for ourselves and for our children recognize the necessity of free conscience, free thought, free expression, free speech, and a free ballot-box for the maintenance of our free republic, the protection of our properties and the preservation of our personal liberties. Let us be proud of our American citizenship and be ever prepared to offer our lives, our fortunes, and our honors in its defense and in defense of the American flag.

THE Oroville Register says: Mining prospects in this vicinity are excellent, and a large amount of money will be invested in the mines of Butte before the end of the year.

VERY little of the copper produced at the smelting works of the Rio Tinto, Tharsis and Cape companies during the past six months has been sold.

A. CAVAGNARO was killed by a blast in the Ute mine, Angels, Calaveras county, last week.

THE French syndicate is estimated to have on hand about 85,000 tons of copper.

The Charleston.

How the Cruiser Happened to be Built in San Francisco.

It happened in a committee-room the other day, when I was in conversation with some of my friends who are present at this moment, that a subject was suggested. It was in reference to the steel-producing capacity of the State of California. I happened to be on that coast, a member of the Committee on War Ships and Ordnance, and having an opportunity to make some investigation, I did so. I came in contact with steel producers and manufacturers and with the builders of steel ships, colliers and other ships that run up and down the coast of the Pacific. They were building them at San Francisco. I went down and examined the works that they had. In the works there was found every modern improvement.

There was a very enlightened man, who was raised at a lathe or in a machine-shop in Baltimore, and who had gone over to the Pacific Coast. The gentlemen who were the stockholders in that enterprise had sent him abroad through this world for the purpose of ascertaining the condition of the machinery which was employed in the construction of great ships and great guns in every nation of the earth. Being very active and a very enlightened man, he gained all the information that was necessary. He came back, and they sold out their old plant, moved a little farther up the bay and built an establishment there which utterly astonished me, both for its capacity and for the splendor of its arrangement. He was then about to launch a caisson, which he was building for the dock at Mars Island navy-yard, a very beautiful and splendid structure of California steel.

In conversation with him about his capacity for building on the coast, I said to him: "Why do you not attempt to build some of the iron ships on this side of the continent?" "Why," he said, "we have had no opportunity to do it. If you make your provision of law and authorize the Secretary of the Navy to make contracts, we will inform him of our capacity, and doubtless we can get contracts for building ships." So when a naval-appropriation bill came up I ventured to offer an amendment to it, which was passed and adopted by both Houses, requiring that the Secretary of the Navy, in his offer for hullings for ships, should offer to have at least one of them built at San Francisco. The result was that the contract was taken, and I believe a second one is now being constructed there. Within a few days past the Charleston has been launched from the ways in the bay of San Francisco, and that is the first steel or iron ship for the navy that has ever been built on the Pacific Coast.

Mr. President, that all resulted from the fact that there was a man of enterprise there and there were gentlemen of capital to back him. They had confidence in him, and he had confidence in his ability to build a ship. We have now started that enterprise on the Pacific Coast, and after this time the Pacific Coast will yield her quota of vessels to the American navy just as rapidly as we desire that they shall be produced.—Senator Morgan in Congressional Record.

THE LICK INDUSTRIAL SCHOOL.—All of the Lick trustees, with the exception of E. B. Mastick, are absent from the city. Charles M. Plum, who is in New York, has written to Secretary Matthews stating that he will return within a few weeks. Captain R. S. Floyd, who has been in the country for the benefit of his health, has also written, stating that he is improving rapidly and will be able to return in a short time. Judge John M. Boat, secretary of the trustees for the School of Mechanic Arts, is also absent. Upon the return of all these gentlemen the first important step will probably be taken to make arrangements for establishing the School of Mechanic Arts, for the founding of which the sum of \$540,000 was bequeathed in the will of the late James Lick. This project has long been delayed on account of several obstacles that have intervened, such as selecting a suitable place for the school and the best manner of making the appropriation. The trustees for establishing the school have at last become impatient, and it is probable that a permanent understanding with the trustees of the funds will shortly be reached. After the work is commenced it will probably be a year before it is entirely completed.

WHAT THE MINER PRODUCES.—The farmer toils in his field from sunrise till sundown, warring against every kind of pest and natural enemy until he harvests his crop. He then takes them to market and receives what the sharpest, who buy his commodities, may see fit to give him. The fruit-grower may get good prices for his productions till there is an over-production, then down they go. The only producer who can tell in advance what his product will bring in the market is the gold miner. He knows that every ounce he digs from the soil will be worth dollar for dollar. His risks in finding deposits are great, but not more so, perhaps, than are the risks in other occupations. The farmer has adverse winds, drouths, natural pests, etc., to contend with, which make his business hazardous, as much so, probably, as the miner's. The honest miner who has a good claim has no competition. Every one wishes him well. What he produces is so much wealth added to the world. It is practically indestructible. He can let the balance of the world whistle, while he smokes his pipe in peace. Happy, honest miner.—Nevada Herald.

THE amount of bullion tax collected this year in Nevada is \$35,000.



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SAN FRANCISCO

Saturday Morning, Aug. 25, 1888.

TABLE OF CONTENTS.

EDITORIALS.—A Quadruple Compound Engine; Mine Surveying, 121. Passing Events; Why Mining Has Not Quite Kept Up; Unpatented Formulas and Trade Secrets; Manufactures at Seattle, W. T.; Washington Territory Mines, 124. The Russell Leaching Plant, 125.

ILLUSTRATIONS.—Quadruple Compound Engine Built by the Fulton Iron Works, 121. Works for the Russell Process, 125.

MISCELLANEOUS.—The Achievements of Mechanics; The Charleston, 122. The Russell Process; Sulfate Against the Eureka Consolidated; Employers and Inventions, 123. Rewards for New Gold Fields; San Luis Obispo Oil, 127.

MECHANICAL PROGRESS.—The Development of Electricity in the United States; Razors and Their Manufacture; The Application of Zinc to Iron; Rubbing Surfaces; Making Copper Steam Pipes; American Society of Mechanical Engineers, 126.

SCIENTIFIC PROGRESS.—Shooting Stars—The Possible Origin of Comets; The Scope of Scientific Education; Corrosion and Brittleness; Origin of Artesian Wells; A Large Terrestrial Globe; Wrought Iron Work; Clockwork in Photographic Printing, 126.

GOOD HEALTH.—Health of the State; Cancer; Lemonade; Imaginary Pains; Cholera, 127.

USEFUL INFORMATION.—How to Act at a Fire; Care of Gloves; Testing Exterior Stains; Artificial Silk; Languages; A Peculiar Deposit; Colors from Coal Tar; Extinction of Bird Species; Effects of Saccharine; Zinc and Quicksilver, 127.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 128-29.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 122.

Business Announcements.

[NEW THIS ISSUE.]

Stenographer—Misses Devlin.

See Advertising Columns.

Passing Events.

A terrible disaster occurred at the entrance of San Francisco bay on Wednesday, when a number of people lost their lives by a steamship collision and the sinking of one of the vessels. The accident was due to a fog in the channel and a probable misunderstanding of the fog signals.

On another page is given a description of the first quadruple expansion marine engine ever built here. This marks a very important step in the progress of marine engineering. The trial of the engine amply proved the claims of the designers in the direction of economy in the use of steam.

Both Washington Territory and Oregon are making rapid advances in the mining industry. With more reduction works, which are now being furnished, old districts will be brought to the front and new ones rapidly developed. The mineral resources of Washington particularly have long been neglected.

The winter season in California and Nevada has been short this year, and lack of water has retarded mining operations in many places.

It is reported that S. Wenhan, owner of the Cortez mine, near Beowawe, Nev., has gone to England with the view of disposing of the mine to English capitalists.

The last dividend of the Calumet and Hecla Copper Mining Co. of Michigan—\$500,000—made an aggregate of dividends of the company of \$30,350,000.

Why Mining has not Quite Kept Up.

Vast as have been the improvements made of late years in the business of mining for the precious metals, these improvements have been by no means so signal as those that have meantime characterized most other lines of human endeavor. In the art of printing and engraving, in the construction of ordnance and firearms, in the manufacture of agricultural and mechanical implements and machinery, in locomotion and transportation, both by sea and land, and in a great many other arts, industries and pursuits, more advancement has been made during the last half century than in any branch of mining. We speak now of arts and industries that had an existence 50 years ago, and not of those original inventions of more recent times, such as the photograph, telegraph, telephone, electric motor, etc., which, besides being new in themselves, are marked by other features of special significance.

Recalling the most noteworthy mining improvements of modern date, we find among them none that has brought to the business such gains as have inured to the grain-grower through the introduction of the combined reaper, thrasher and winnower; nor yet any that economize labor as do scores of machines now employed in the various branches of manufacturing, the nearest approach to these in the department of mining consisting in the employment of water under pressure for auriferous gravel washing. Ore crushing continues to be performed for the most part with stamps, greatly improved, it is true, yet not essentially different from those in use a hundred years ago.

If, in most other branches of the business, greater progress has been made, there is still everywhere room for improvement; there obtains a general feeling that there is in our mechanisms and methods much that is insufficient if not defective. It is felt that we ought to save the precious metals more closely than we are doing; that general expenses ought to be reduced, and that more system and certainty ought to pervade the industry all through. While it is not easy to emphasize the weak points of the system, we are conscious they exist—conscious that mining for gold and silver suffers in these particulars by comparison with most other leading pursuits; and this we say not forgetting what has been achieved since gold was discovered in California. It may after all be the case, not that mining has advanced so little as that other industries, stimulated by a competition absent in mining, have during these later years shot ahead at an unwonted, some of them at an almost unnatural, rate. If these industries have in some respects outstripped mining, it has been because of this deadly rivalry which left them no alternative but that of keeping even with their competitors or retiring from the contest. For this sort of effort there has existed no imperative necessity in the business of mining for the precious metals. It has not been obliged to strain its energies in order to live.

Nevertheless, the time has come when this, like the other great industries of the age, may be expected to distinguish itself in the way of original invention and discovery; and that it is about to make a great forward movement there is every reason to believe. Aside from other special causes working to that end, the employment of electricity, both as a motor and an amalgamator or a promoter of amalgamation, promises to secure great advantages to mining. Encouraged by what this new agency has already effected, we await further results with large expectations, satisfied that it will bring to the business gains of the first importance.

It may be expected, too, that from the many different styles of pulverizers now contesting for supremacy there will have evolved in the ore-crushing service something better than anything at present in use. Such improvement in the manufacture of high explosives may also be hoped for as will diminish their cost while it adds to their efficacy and safety. And so of many other departments of the business, mining presenting to inventive talent a most inviting field. To the ingenious and skillful it offers such rewards as must cause them to put forth their best efforts, inasmuch as these rewards appeal to both the cupidity and the ambition of all so especially endowed. Our conviction is that some of the most useful discoveries of the proximate future will occur in the domain of gold and silver mining.

Unpatented Formulas and Trade Secrets.

It is a common impression that no invention is protected unless patented. This is true of any invention which is open and exposed. It is then given to the public, if not patented. But there is a class of inventions which is endeavored to be kept secret, because a patent would expose them to use, and detection is difficult. Formulae processes and trade secrets are of this class, and manufacturers find their safety in perfect secrecy. Yet they have to be intrusted to their workmen, and rival manufacturers endeavor often to profit, by seeking to employ such workmen educated in their rival's secrets, and think, perhaps, they have both a legal and moral right to do this, if they can. This is an error, as has been proven by many decisions based on common law. Such inventions and trade secrets are property, and when studiously kept, or endeavored to be kept, secret, cannot be legally appropriated by anybody.

A case in point was passed upon in the Supreme Court of New Jersey in 1886. The statement was given as follows: "Chancellor Reagan decided a case which is of unusual interest on account of the peculiar relief sought from the court. The court is asked to restrain a man from divulging a secret. The complainant claims to have discovered valuable secrets in connection with the manufacture of Cordovan leather, and for coloring kangaroo, alligator and snake skins. He had been engaged in the business about eight years, and employed his bookkeeper and superintendent with the understanding that they were not to divulge the secrets of the business. These men having learned his methods made arrangements with two strangers to go into business and compete with the complainant, their late employer.

"That the facts set up in the bill entitle the complainant to relief admits of no doubt," says the court. "A discoverer of a secret process of manufacture, whether patentable or not, has property therein. If the injunction be dissolved, the secrets would become known and an irreparable injury be done to the complainants." The defendants were restrained from using the secret process of which the complainant was the discoverer.

Manufactories at Seattle, W. T.

Our correspondent has recently visited the city of Seattle, W. T. There is much manufacturing now done in that growing place. The Washington Iron Works are as extensive as anything to be found in Oregon or Washington Territory. About 150 workmen are constantly employed, and the works cover an area of half a block. Engines, boilers, mills, mining and marine machinery are constructed, besides iron work for bridges, etc. Two iron bridges for Spokane Falls are now being made. Nearly all of the work turned out is for Washington Territory. J. M. Frink is superintendent of the works.

Moran Bros. employ about 35 men, and make a specialty of marine work. The supply of iron comes partly from the mines of the Territory, probably one-half, and the balance is imported from San Francisco and abroad.

Allmond & Phillips employ about 50 men. Considerable work is done at the foundry for Alaska and British Columbia. Eastern Washington Territory and the Puget Sound country keep the establishment busy.

F. Marco keeps 14 men busily employed in manufacturing wagons and carriages. He turns out over \$2500 worth of work per month.

Besides the above, and other factories where iron work is done, there are many lumber-mills. The Hall, Paulson Furniture Co. employ 25 to 30 men. The Stetson & Post Mill Co. (C. F. Reitze, foreman), employ 50 men in their saw-mill, where 65 M. feet of lumber per day are sawed, and 45 men in the factory, where building materials are turned out. The Seattle Lumber and Commercial Co. employ 75 men in mill and factory, saw 50 M. feet of lumber per day, which is largely worked up into building material for the local market. The Mechanics' Mill employs 35 to 40 men in mill and factory. The Oregon Improvement Co. employs 40 men, and saws 54,000 feet of lumber per day. The Excelsior Works, recently established, are a great success, and find a ready market for their product. They employ about 20 workmen.

There are other smaller establishments. The

above indicate that the city-front of Seattle, where all of these establishments are located, is a busy locality. One noticeable feature with regard to one and all of these works is that they are crowded to fill their orders, and many are working overtime to accomplish the task. With the present progress and prosperity of Washington Territory continued, there is no more favorable point on the coast for manufacturing enterprises than on Puget Sound.

Washington Territory Mines.

Our correspondent at Tacoma sends us notes of a new mining district lately opened in the northern part of Washington Territory. The region in question is known as the Conconully mining district. It is located along and adjacent to the Conconully creek, which is a small tributary rising near the boundary of British Columbia, and following southward to its junction with another stream which flows into the Columbia. The new district is reached by rail from Tacoma to Ellensburg on the Northern Pacific railroad, thence by stage 32 miles across the country to a point on the Columbia river, then by boat 120 miles up the Columbia to the Conconully, and from there by a wagon-road up that stream some 30 miles to the mines. Our correspondent's informant with regard to these mines was Thos. L. Nixon, a reliable gentleman of Tacoma, who has mining interests in the Conconully district, and who has just received his first carload of ore from one of his mines—the Launa. The ores of this district are mainly silver bearing, and assay in some instances as high as \$1000 per ton. Most of the ores, however, are of much lower grade, ranging in value from \$30 to \$50 per ton.

Little development work has as yet been done on any of the claims, the ore being taken from the surface. The ledges are of good thickness, so that the mining is done with extreme cheapness. The ore being of a class requiring concentration, parties have recently erected a concentrator in the district, so that the miner may get his product into valuable shape before shipping to smelters at San Francisco or elsewhere. These mines are attracting a great deal of attention in Washington Territory, and they promise excellent results for all labor expended upon them. The Tacoma, Ellensburg & Conconully Rwy and Navigation Co. is the name of a corporation which is taking in hand the forwarding of passengers and supplies for the new country, and they have already sent a great deal of mining machinery and merchandise to this camp. We hope to hear good reports from the Conconully district as the work of development progresses.

A BAR of gold bullion valued at \$19,000 was the result of a recent crushing of 165 tons of ore from the Lapanta mine, Hawthorne district. This shows a yield of \$66 a ton instead of \$1000, as was heretofore claimed to be the value per ton of that ore. Still, \$66 rock is pretty good.

ABOUT 300 negro miners have been brought from Illinois by the Northern Pacific Coal Co. to work their new mine above Koslyn, Washington Territory. There is considerable feeling about the "importation" among the white miners whom the negroes are to displace.

N. A. HARRIS, resident agent of the Big Bend Tunnel & Mining Co., has resigned his position and gone to commence operations on a contract he has to flume and grade 3200 feet of river about two miles above Oroville.

The Cherokee gold mine, Butte county, recently cleaned up \$32,000 from the "head flumes." They only expected \$16,000 or \$17,000.

MONTANA mines have paid in dividends so far this year \$1,926,000. Of this, Granite Mountain has paid \$1,200,000.

LARGE numbers of people now visit the Lick Observatory. There were over 200 there on Saturday night last.

DR. J. H. RAE, superintendent of the Carson River Dredging Company, left here on Wednesday for Dayton, Nev.

PIPE for the Tuscarora water-works is being shipped. There will be 66,000 feet in all.

AN immense rich pocket has been discovered in the Concepcion mine, Mexico.

The Russell Leaching Plant.

The working drawings here given of the plant for the Russell leaching process comprise the best features of five leaching plants, built especially for the process, and of the Sombreret plant now being constructed. With the exception of two minor details on the precipitating tanks, there is nothing given but what has stood the test of actual practical experience. The plant is entirely independent and complete as it stands, and may be situated wherever convenient, without reference to the position of the crushing plant for raw ores or for the crushing chloridizing plant for roasting ores, except as

regards the easy transportation of the raw or roasted ore between the two plants. Consequently when either one of the two above-mentioned plants for the preparation of the ore already exists in connection with amalgamation, the change to the Russell process can be made by the erection of the plant herein described without stopping or removing the amalgamation plant. The plant has its own boiler, and no engine is required.

The following is an index to the parts of the plant, as shown in the plate:

A. Leaching tanks; B. Solution-precipitating tank; C. Wash-water; D. Solution pump; E. Storage-tank for sulphides; F. Filter press pump; G. Storage tanks for solution; H. Storage tank for hot solution, or for preparation of extra; I. Cast-iron tank for preparation of so-

dium sulphide; J. Sheet-iron tanks for storing sodium sulphide; K. Iron pressure-tank; L. Filter press for sulphides; M. Steam-drier for sulphides; N. Boiler; O. Fire pump for sluicing; P. Solution pump; Q. Main ore track to leaching-tanks; R. Side tracks to leaching-tanks; S. Side tracks in chemical-room; T. Grade line between boiler and steam-drier; U. Grade line through sulphide storage-tank.
a. Tailing chute (to cars); b. Sluice gate for tailings; c. Sluice trough for tailings; d. Box for chemicals for extra solution; e. Ore car; f. Ore-car truck; g. Chemical car; h. Special extra trough over leaching-tanks; i. Solution trough over leaching-tanks; j. Solution trough to solution precipitating-tanks; k. Wash-water trough; l. Trough to conduct sulphides to sulphide storage-tank; m. Trough to conduct solution to solution pump sump; n. Waste wash-water trough; o. Solution pipe to leaching-tanks; p. Hot-solution extra-solution pipe to leaching-tanks; q. Water pipe to leaching-tanks; r. Hose for circulating extra; s. Hose from leaching-tank to siphon pump; t. Hose from leaching-tank to triple launder; u. Hose from siphon pump to triple launder; v. Siphon pump; x. Tailing car; y. Hose connections for sluicing; z. Waste-water pipe from triple launder.

a'. Pipes from triple launder to solution precipitating-tanks; b'. Pipes from triple launder to wash-water precipitating-tanks; c'. Valve or "gate" for sulphides; d'. Surface discharge for precipitating-tanks; e'. Sodium sulphide pipe; f'. Pipe for precipitated wash-water; g'. Connection between solution pump and sump; h'. Box and strainer around outlet; i'. Drip pipe from solution pump; j'. Pipe from pump to storage-tanks; k'. Connection between sulphide storage-tank and pressure-tank; l'. Connection between pressure-tank and press; m'. Siphon pump in filter press sump; n'. Solution pipe to sodium sulphide storage-tanks; o'. Pipe for drawing off sediment from pump sump; p'. Pipe for returning solution to solution pump; q'. Small windlass for steam drier; r'. Boxes over storage-tanks to prevent agitation of the solution; s'. Boxes and strainers around outlets; t'. Lead heating coils in storage-tanks; u'. Drip from lead coils; v'. Triple connection between the three storage-tanks; w'. Main steam pipe; x'. Water pipe from fire pump for sluicing; y'. Storage room for caustic soda and sulphur; z'. Trapdoor to filter press pump; a'. Gauge valve on side of pressure tank; b'. Pipe for drawing off sediment from solution storage-tanks; c'. Siphon pump for circulating solution through chemical-box in extra solution-tank.

WORKS FOR THE RUSSELL PROCESS.

Fig. 4a. SECTION AT XX (Fig. 4.)

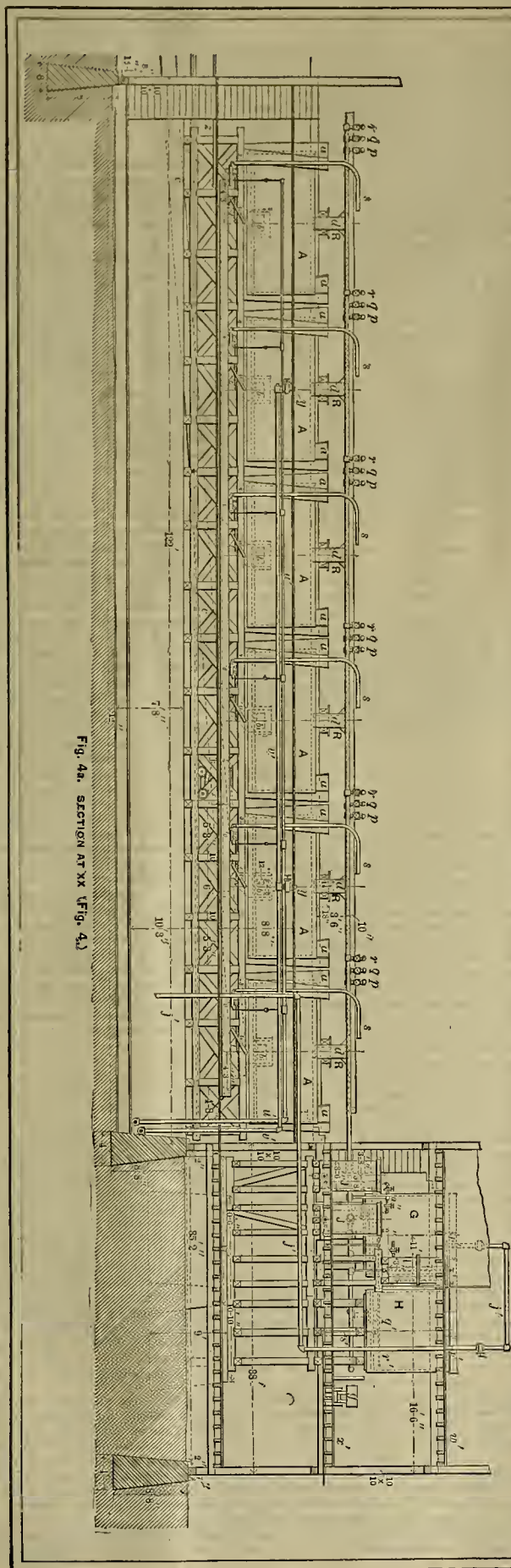
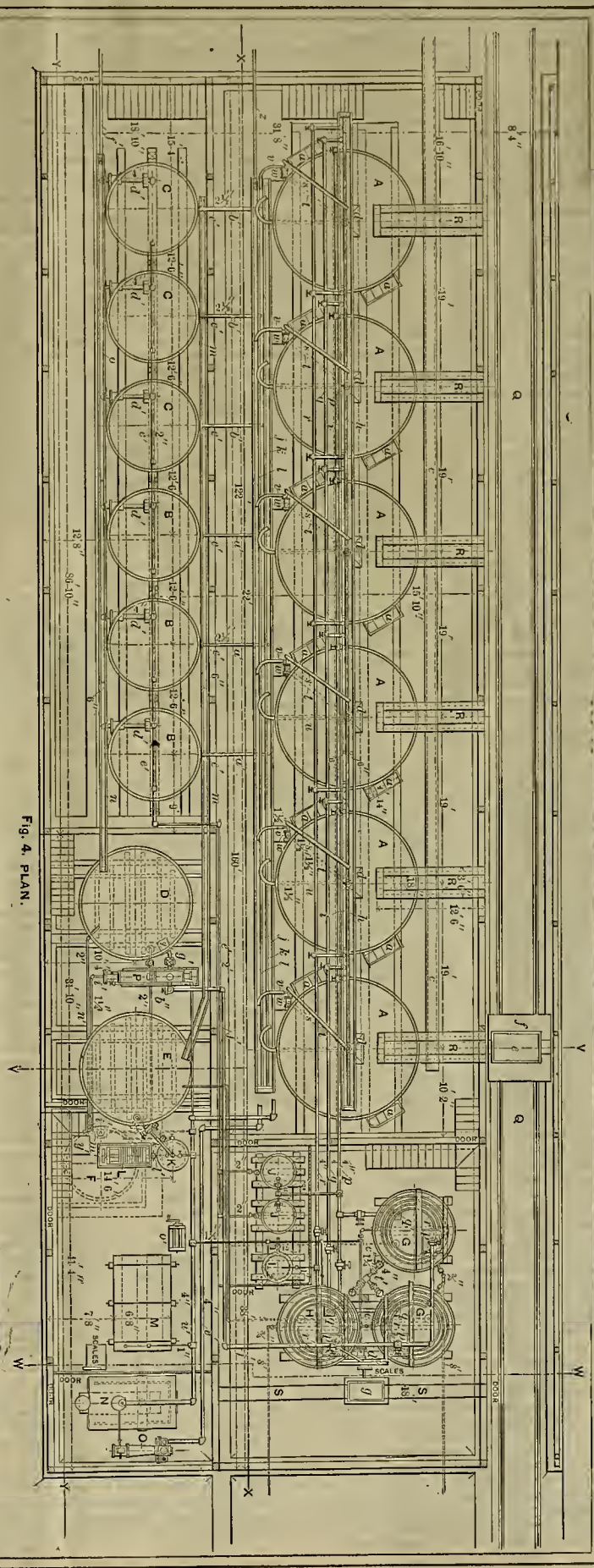


Fig. 4. PLAN.



MECHANICAL PROGRESS.

The Development of Electricity in the United States.

There are now about \$6,000,000 invested in the manufacture of electric motors in the United States, and this large investment has nearly all been made within the last three or four years, says the *New York Sun*. It represents either the independent investment of companies engaged in the exclusive manufacture of motors, or an increase in the capitalization of companies that manufacture electric-light appliances, and find the construction of electric motors a good auxiliary industry. Some of these companies employ many hundred men, sometimes approaching a thousand, and they turn out motors almost innumerable each year. These motors are of all sizes, from one-half horse-power, for driving sewing machines and such other light work, up to several hundred horse-power for heavy work. They are becoming a driving force in almost every industry, and can be utilized in localities where the cost of obtaining fuel would almost equal their operating expenses.

The chief secret of the rapid advance of this new mechanical agent is found in the flexibility of its resources. Electricity is not the generator of power, but only this agency for its transmission and distribution, as it is an agent for the transmission of the human voice over the telephone wire. Through its resources power can be distributed to any point and in quantities to suit the customer. Steam, water, air, caloric, or any known agency for generating power, is either stationary or it demands stationary appliances; but electricity is its messenger boy, its Puck, who will consent to do its errands invisibly, and never ask a day off or the grant of liberty.

Does a lady want an infinitesimal bit of electrical energy to relieve her hoot on the treadle of her sewing machine? It can be delivered in her room through an iron box not much bigger than her reticule. Is the restaurant keeper plagued by an invasion of flies that expel all but the most hungry and least profitable customers? They can be gently wafted to the door by a multitude of revolving fans and conged out either into this bright sunlight or the refreshing shower. Everywhere, anywhere, without a particle of dust, offensive odor or disagreeable noise, the electric motor can be set to work, and, while it will bring the substances of the thing wanted, it will leave behind everything that can give offense.

The electric motor has passed its experimental stages, and this day seems to be rapidly approaching when every house will find something for it to do in lifting burdens from floor to floor, and performing every possible labor that can be done by machinery. Manufacturers have not yet begun to construct motors ornamented with gold-leaf, mother-of-pearl and precious stones to rock cradles in the nurseries, but these requirements will come in time.

Razors and Their Manufacture.

The manufacture of razors in the United States is comparatively recent, writes Thomas J. Bowditch in the *Troy Times*, but already it bids fair to equal at least that which has been carried on at Sheffield, England, for centuries. The utmost care is taken to obtain fine steel, but cutlers sometimes find the result uncertain. The small actual cost of manufacturing razors may be inferred from the fact that a razor is supplied to every soldier and sailor in the British army and navy at nine cents each.

The division of labor is much used in producing a razor, the blade having to go through at least 20 operations. The list of the principal of these is as follows: The blade is molded; forged; ground to take off the black scales; drilled for the rivet and stamped with the maker's name; hardened and tempered; ground; the shoulders are ground on a dry stone; the blade is ground on a leaden wheel, which gives the true curve to the surface; the tang and back are glazed by a leathern glazer; polished on a buff wheel with crocus; handled; set. In tempering razor blades they are heated in a coke or charcoal fire, and dipped into the water obliquely. They are then laid on their backs in a clear fire, six or eight together, and they are removed when the edges, which are yet thick, come down to a pale-straw color.

The edge of a razor consists of a great number of minute points, commonly called teeth, which, if the razor is in itself good and in good condition, follow each other through its whole extent with great order and clearness, and constitute by their unbroken regularity its exclusive keenness. The edge acts on the beard not so much by the direct application of weight or force as being drawn, even slightly, along it; because by this operation the fine teeth of which it consists pass in quick succession in the same part of the substance. The best razors will have the teeth of their edges set almost as regularly as a good saw, and the best test in trying a razor is to examine the edge by means of a strong magnifying glass. This almost explains the good effect on the razor caused by dipping it in hot water, which necessarily clears the edge of any small clogging substances.

Barbers often assert that razors get tired of shaving, and that they will perform satisfactorily if permitted to rest for a time. It will be found by microscopic examination that the tired razor

from long stropping by the same hand and in the same direction has the ultimate fibers of its surface or edge all arranged in one direction, like the edge of a piece of cut velvet; but after a month's rest these fibers rearrange themselves, heterogeneously, crossing each other and presenting a saw-like edge (as described above), each fiber supporting its fellow, and hence cutting the beard instead of being forced down flat without cutting, as when laid by.

Among the distinguished persons connected with the craft was Asishius, a great mechanic, who first applied air as a motive power, and invented a water-clock and a hydraulic organ, some 200 years ago. The fathers of Sir Richard Arkwright, Lord Tenterden and Lord St. Leonard need razors to gain a living.

The Application of Zinc to Iron.

A continental journal quotes some interesting particulars regarding a new method of applying zinc to iron. It is stated as a fundamental principle that protection from rust only is afforded by that layer of zinc which has become united to the iron by electro-chemical process, having lost its properties as zinc, and thus not being liable to further oxidation. Any excess of zinc must, therefore, be regarded not only as useless, but also injurious. It is further stated that iron to which zinc is applied by this new process does not peel, and can be soldered with either hard or soft solder. Not only does it perfectly resist all influences of temperatures, but it can be heated without injuring the layer of iron and zinc alloy, or affecting its protective action.

As a preliminary, the iron is cleaned by being subjected to the action of a mordant. It is then drawn through a solution of chloride of zinc, a little ammonia is thrown upon it (or else it is put through a solution of ammonia) and it is then immersed in the zinc bath. The new apparatus is placed near the heating appliance, and is so constructed that two rotating cylinder brushes are placed over the vessel containing the zinc, and can be brought nearer to or removed from each other in a horizontal position, even during their rotation. When the iron plate is to be placed in the zinc bath the brushes are moved sufficiently far apart to allow of this being easily done. The iron remains in the bath until it has assumed the temperature of the contents. The metal is then lifted out of the bath sufficiently for its upper portion to reach the middle of the steel cylindrical brushes, which are put into rotary motion by this mechanism, and are brought so near each other that both sides of the metal are subjected to their action. Their velocity is regulated by their distance from the surface of the zinc bath, and by the thickness of the metal to be treated. These points are of importance, and can be taken into account during the construction of the apparatus. The superfluous zinc is removed by the brushes while in a soft condition, so that only the clean zinc alloyed layer is visible after the operation. This layer is not a coating of zinc, but is the original surface of the iron, and therefore inseparable from it. The metal thus treated can be worked in various ways without any risk of the zinc becoming detached, as is now the case. It is likewise claimed for this process that it imparts to the metal the property of taking a polish or being galvanized with any desired metallic coloring.

RUBBING SURFACES.—The committee of master mechanics on crossheads and guides puts itself on record as follows in relation to rubbing surfaces: "There can be nothing better for rubbing surfaces than cast iron, if well lubricated. If it is exposed to dust and cinders, it would be well to use strips of Babbitt metal, but with the Dean crosshead, which always runs in clean oil, this is unnecessary. Phosphor-bronzes give admirable results for crosshead gibs. Whatever form or material is used for crossheads and gibs, the rubbing parts should always be well scored with grooves for retaining oil to supply the moving parts as they journey back and forth." This opinion, says the *American Machinist*, is important as indicating the view of practical men upon a question upon which there has been considerable difference of opinion. The utility of such opinions is not, of course, concluded by locomotive practice, but the views expressed are equally worthy of consideration by mechanics in every line of machinery.

MAKING COPPER STEAM PIPES.—Steam pipes of copper are now made by electro deposition from sulphate of copper solution. The pipe is formed on an iron core in the depositing bath, and the deposited copper is pressed by a moving tool as it is deposited, so as to give a fibrous strength to the crystalline copper. After the pipe is thus formed it is subjected to hot steam, which expands the copper shell, or pipe, clears off the iron core, thus separating the two. These pipes have no joint, and are said to be very strong, tests showing that they break with strains of from 27 to 41 tons per square inch.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—The eighteenth convention of the American Society of Mechanical Engineers will be held in Scranton, Pa., beginning Monday evening, October 15th. The meeting comes somewhat earlier this year than usual in order that the hill country of Pennsylvania may be enjoyed to the best advantage. Particulars of the program and papers to be read will appear later.

SCIENTIFIC PROGRESS.

Shooting Stars — The Possible Origin of Comets.

But very little is definitely known in regard to the origin of meteors and shooting stars. Some hold that they are all one and the same—others that the one is a nebulous body originating from nebulous matter within our solar system and that the other is composed of more ponderous substances, and consists of the breaking up of solid bodies—planets or comets. What we do know of them has been briefly summarized as follows:

1. They are vastly more numerous than any one has any idea of who has not watched them continuously for many nights. Astronomers who have kept a record for many years assure us that the average number seen by one observer at one place on a clear, moonless night is 14 per hour, which is shown by calculation to be equivalent to 20,000,000 daily for the whole earth.

2. They are not terrestrial phenomena, moving in the lower atmosphere, but celestial bodies moving in orbits and with velocities comparable to those of planets and comets. Their velocities are seldom under 10 miles a second or over 50, and average about 30, the velocity of the earth in its orbit around the sun being 18. They are of various compositions, comprising both a large majority of smaller particles which are set on fire by the resistance of the earth's atmosphere and entirely burned up and resolved into vapor long before they reach its surface, and a few larger ones known as meteors, which are only partly fused or glazed by heat, and reach the earth in the form of stony masses.

3. They are not uniformly distributed through space, but collect in meteoric swarms or streams, two at least of which revolve around the sun in closed rings which are intersected by the earth's orbit, causing the magnificent display of shooting stars which are seen in August and November.

4. They are connected with the comets, it having been demonstrated by Schiaparelli that the orbit of the comet of 1066 is identical with the August swarm of meteors known as the Perseids, and connections between comet and meteor streams have been found in at least three other cases. The fact is generally believed that comets are nothing but a condensation of meteorites rendered incandescent by the heat generated by their mutual collision when brought into close proximity.

5. Their composition, as inferred from the larger meteors which reach the earth, is identical, or nearly so, with that of matter brought up from great depths by volcanic eruptions. In each case they consist of two classes—one composed mainly of native iron alloyed with nickel; the other of stony matter, consisting mainly of compounds of silicon and magnesium. Most meteorites consist of compounds of the two classes, in which the stony parts seem to have broken into fragments by violent collision and become imbedded in iron which has been fused by heat into a plastic or pasty condition.

The Scope of Scientific Education.

A Jesuit with whom I was conversing on educational questions once told me, in depreciation of my position as a man of science, that the naturalist of to-day can be a physiologist or a physicist, mineralogist, geologist, zoologist, botanist, or chemist, and no more. He cannot overlook the whole of science, and can at most only really know a part of his own branch, from which he is not, of course, justified in drawing any general conclusion.

It was otherwise with the Jesuit, who excluded himself from no department of knowledge. This man touched accurately what is now recognized as a growing peril to the general significance of science in mental development—the continuous contraction of the individual's fields of labor, or specializing. It is right for naturalists in these days to make themselves masters in their own branch, and masters usually in that alone, unless they are in a position to obtain a survey over the whole of the sciences. But it is wrong, in the present condition of knowledge, to deny them a general acquaintance with all scientific matters. That would be to put their capacity below that of the Jesuit, who only desires to obtain a superficial view of science in order to aid him in holding his position in sophistical disputations against it and in favor of his own dogma.

Most naturalists and scientifically educated persons have, moreover, been trained in a liberal range of studies, and are well qualified to form a judgment on general scientific as well as upon important and fundamental philosophical questions. Yet we are living, to a large extent, upon the provision left by the fathers. The dividing up is daily becoming more and more minute, and is destined in time to throw a broad shadow over the outlook, unless the demand for a many-sided basis of training as a defense against the evil is universally insisted upon.—From "*Specialization in Science*," in *Popular Science Monthly*.

CORROSION AND BRITTLINESS.—The *Journal of the British Society of Chemical Industry*, in a recent issue, remarks that brittleness after corrosion is exhibited by all kinds of iron and steel, and is more marked if a plate of amalgamated zinc be connected with the iron, so as to

form a couple in the solution. It cannot be ascribed to accidental flaws in the metal employed. If two iron wires are made electrodes in a bath of sulphuric acid, the anode will be much attacked, but will be scarcely affected in regard to brittleness, while the cathode will become bright on its surface, but will be extremely brittle. Hughes and Robert ascribe this effect to the occlusion of hydrogen by the iron. After a long series of researches, it has been found that the character of iron and steel is always altered if exposed to influences which occasion an evolution of hydrogen upon the surface, and that contact of the iron with zinc intensifies this effect, so that a shorter time is necessary to produce it. The resistance to flexure, as well as the transverse strength, is always diminished, as is the extensibility under tension, while the modulus of rupture is practically unaltered, unless in some cases by the excessive corrosion itself. Heating the metal suffices to remove the brittleness, and placing it in a dry place for some time may have a similar effect, but mechanical working in the cold is without effect in this direction. Cast iron is not influenced, or is less so than wrought iron, by superficial hydrogen development. Four samples of corroded iron, heated carefully in pure dry nitrogen, gave off 0.0021 to 0.0052 per cent of hydrogen respectively—numbers which, it is thought, cannot represent quite the whole of the hydrogen actually present.

ORIGIN OF ARTESIAN WELLS.—The sedimentary rocks in their great thickness enclose a succession of water sheets or water-levels occupying distinct stages and extending with uniform characters under whole countries like the strata to which they are subordinated. It is proper to remark here, says *Popular Science Monthly*, that by the term water-sheet is not meant a real bed of water lodged in a cavity between solid masses that serve as walls to it, but water filling the minute interstices of the cracks of a rock. Continuous and regular in sand, these sheets are usually discontinuous and irregular in limestones and sandstones, in which the water only occupies more or less spacious fissures. When natural issues are wanting, human industry is able, by boring, to make an opening down to the subterranean waters, which it causes to jet up to the surface and sometimes to a considerable height above. The thought of undertaking such works is a very ancient one. The Egyptians had recourse to them 40 centuries ago, and they were executed in France in 1126 at Artois, whence the name of artesian wells has been given to them. The water-levels of the cretaceous strata, from which the French artesian waters issue, are not always of advantage; but in the north of France and Belgium they constitute the most formidable obstacle which miners have to encounter in reaching the coal-heds. A striking confirmation of the theory of the surface of supply of the artesian waters has been observed in Tours, where the water, spouting with great velocity from a well 110 meters in depth, brings up, together with fine sand, fresh water-shells and eeds in such a state of preservation as to show that they could not have been over three or four months on their voyage. Some of the wells of the Wady Rir have also ejected fresh-water mollusks, fish and crabs, still living, which must, therefore, have made a still more rapid transit.

A LARGE TERRESTRIAL GLOBE.—According to *Nature*, a large terrestrial globe, constructed on the scale of one-millionth, will be shown at the Paris exhibition of 1889. A place will be set apart for it in the center of the Champ de Mars. The globe will measure nearly 43 feet in diameter, and will give some idea of real dimensions, since the conception of the meaning of a one-millionth is not beyond the powers of the human mind. Visitors to the exhibition will see for the first time on this globe the place really occupied by certain known spaces, such as those of great towns. Paris, for instance, will barely cover a square centimeter. The globe will turn on its axis, and thus represent the movement of rotation of the earth. The scheme was originated by MM. T. Villard and C. Cotard, and *Nature* says that it has been placed under the patronage of several eminent French scientists.

WROUGHT-IRON WORK.—An English paper says: Wrought iron, very black and old looking, is among the latest pinks of fashion in household ornaments. The black forms a pleasant contrast with the ambers and flame colors and gray-blues so largely used. An order has just been given by a retail house for canning little salt-cellars of silver set in wrought-iron frames and wrought-iron casters picked out with silver Celtic designs. It is a great relief from the everlasting brasswork, and newer than silver ornaments. There is too little attention given to making silver ornaments. Artistic silver is not beautiful enough in itself to stand the commonplace hideous designs one sees so often. A beautiful thing in brass or copper, iron or steel is preferable to any ugly thing in silver.

CLOCKWORK IN PHOTOGRAPHIC PRINTING.—An interesting development in photography is in the use of clockwork in printing from negatives. By this means a continuous web of sensitized paper is drawn at suitable intervals under a negative exposed to a source of light. After printing, the paper is drawn, still by the mechanism, through "washer," "toner" and "fixer" successively, and appears finally as a series of finished pictures, ready for mounting, and all alike in exposure, color and tone.

GOOD HEALTH.

Health of the State.

The regular monthly report of the State Board of Health for July gives returns from 100 localities, in 15 of which there were no deaths during the month. Eighty-five cities and towns report a total of 958. Of this number, San Francisco is credited with 519. When it is borne in mind that this city is set down with a population of 300,000, while the other localities are credited with a total of 407,550, it would appear at first sight that the deaths in this city were altogether an undue proportion. But when we take into account the fact that very many people when taken sick in the country come to San Francisco for treatment, this disproportion may be thus accounted for.

The monthly percentage of deaths in those localities reported upon is 1.31 per 1000. During the month of July, according to the mortality reports received from 85 cities and towns within the State, 958 deaths occurred in an aggregate population of 707,850 persons. This is a monthly rate of 16.08 per 1000. In the classification by diseases, consumption is far in the lead, the number of victims of that disease being 127, while the next highest, which was heart disease, was 72. The list of deaths by consumption, says the report, is remarkably small, being a decrease of 19 from the last report.

There were 12 deaths in Pasadena and vicinity, with a population of 6000, while there were nine deaths in Stockton, with a population of 15,000. These figures do not tend to prove that Pasadena is not as healthy a place as Stockton. Pasadena contains a large number of incurable invalids from abroad, and when these die the death rate is abnormally swelled. Sacramento, with 30,000 population, had but 37 deaths, and San Francisco, with 300,000, had 519 deaths. There are also many invalids from other parts of the State in San Francisco hospitals. If a person gets sick in notoriously unhealthy place, he removes to, and often dies in, a well-known healthy place, so that the death rate of a locality is absolutely of no value in determining its salubrity, unless the former residence of the deceased person is also given.

Cancer.

We notice that the Health Report sets down 24 cases of death from cancer in this city during the month of July, and only 19 for all the other towns and cities reported, although the other cities and towns are credited with more than one-third larger population than San Francisco. This disproportion is to be accounted for by the fact that large numbers come to this city to be treated and die here. We would suggest that, in view of the rapid increase of this terrible malady, there should be a special hospital established in this city for the care and treatment of this disease. Such a course is all the more called for for the reason that it would give an opportunity to more readily observe the different modes of treatment applied to this disease and to judge of their respective value.

Cancer is a disease which strongly appeals to the sympathy of the public from its terrible agony, its inexorable persistency and the frankly acknowledged inability of the medical faculty to stay its progress. It is, moreover, increasing all over the world more rapidly than any other disease. It is this one dread malady which seems to grow and increase with the progress of civilization. Will not some of our wealthy and philanthropic people take this matter in hand? We know of no movement in that direction which would promise more useful and important results. New York has such a hospital, and many other cities in various parts of the world. Why not San Francisco? We understand that suggestions to this effect have already been made, and we trust the matter will not be suffered to rest until its final accomplishment is reached.

LEMONADE.—The use of lemonade, or water acidulated with lemon juice, is proper in warm weather. This acid produces effects that are agreeable, because it lowers the temperature of the system. Of course lemonade should be taken in moderation, like all beverages. Workmen drink too much in hot weather, overtax the excretory organs, and weaken themselves in consequence. A good drink for workmen in mills and foundries is oatmeal-water, with a little lemon-juice or raspberry-juice to give it a flavor. A few sips of this, three or four times a day, are far better than the tumblerfuls of iced water that are poured into the hot stomach. Serious harm often results from excessive iced-water drinking. We doubt not that the majority of sudden deaths among laboring people in summer are due to over-drinking of ice-cold water and of saloon drinks.

IMAGINARY PAINS.—Our readers are familiar with the oft-recurring instances of imaginary pains and cold in amputated limbs. Most people can call to mind, in their own observation, persons who, having lost a leg or an arm, still complain of pains in the extremities of those limbs years after they have been removed. Of course these pains are purely imaginary, but as such are real to the sufferers. A correspondent of the *Phrenological Journal* recites an instance of the manner in which a patient overcame such effects of the imagination much to his comfort. This friend had lost his right hand by hav-

ing it terribly mangled in a planing machine. Having heard and read a great deal about people enduring pain in amputated limbs, he immediately made up his mind that he would not suffer pain in the arm that he had lost; and as soon as the mutilated flesh and bones were removed, he courageously "located the pain where it was" (to use his own expression), viz., "in the stump of the severed arm." Instantly on feeling a twinges of pain reaching apparently into the lost hand and fingers, he would place the remaining hand where the amputated member had been, thus bringing to his mind an immediate realization of the fact that the arm was gone, and so could not be subject to pain. After about two weeks of this "heroic mental treatment" the idea of pain in the severed member was entirely overcome; and though the accident happened six years ago, he has never suffered from a return of it. A like procedure on the part of all persons who are so unfortunate as to meet with the loss of a limb would, we believe, bring about the same result.

CHOLERA.—The July report of the State Board of Health makes the following timely remarks in regard to the cholera: "Cholera is prevalent in Hongkong, and has made its appearance again in Japan. The proximity of cholera, through the constant commercial intercourse between these countries and our own, renders us peculiarly exposed to an invasion of the disease, recollecting the persistence with which cholera germs maintain their existence under the most adverse circumstances. With bowel disorders so prevalent as they are now, the human system is in a condition of receptivity that would readily become infected and develop the disease in its most fatal form. Sir Joseph Fayer, from his great experience in India, maintains that under certain circumstances cholera morbus, or summer cholera, may become epidemic, and is indistinguishable from Asiatic cholera, variation being in severity and not in kind. It is, therefore, prudent to avoid all known causes of bowel disorders, especially overripe or decayed fruit, and all noxious emanations from any source. The strictest hygienic measures should be enforced within our cities, our dwellings and surroundings. All garbage and decaying organic matter should be buried or deeply buried, out-houses cleaned and whitewashed, as cholera, if it once invades our State, will spare none but those who have made themselves secure by sanitary forethought and precaution."

USEFUL INFORMATION.

How to Act at a Fire.

In a lecture before the Society of Arts, London, Mr. A. W. C. Ghean gave the following concise and simple direction how to act on the occurrence of fires: Fire requires air; therefore, on its appearance every effort should be made to exclude air—shut all doors and windows. By this means fire may be confined to a single room for a sufficient period to enable all the inmates to be aroused and escape; but if the doors and windows are thrown open, the fanning of the wind and the draught will instantly cause the flames to increase with extraordinary rapidity. It must never be forgotten that the most precious moments are at the commencement of a fire and not a single second of time should be lost in tackling it. In a room, a tablecloth can be used so as to smother a large sheet of flame, and a cushion may serve to heat it out; a coat or anything similar may be used with an equally successful result. The great point is presence of mind—calmness in danger, action guided by reason and thought. In all large houses buckets of water should be placed on every landing, a little salt being put into the water. Always endeavor to attack the bed of a fire; if you cannot extinguish a fire, shut the window and be sure to shut the door when making good your retreat. A wet silk handkerchief tied over the eyes and nose will make breathing possible in the midst of much smoke, and a blanket wetted and wrapped around the body will enable a person to pass through a sheet of flame in comparative safety. Should a lady's dress catch fire, let the wearer at once lie down. Rolling may extinguish the fire, but if not, anything (woolen preferred) wrapped tightly round will effect the desired purpose. A burn becomes less painful the moment the air is excluded from it. For simple burns, oil or the white of an egg can be used. One part of carbolic acid to six parts of olive oil is found to be invaluable in most cases, slight or severe, and the first layer of lint should not be removed until the cure is complete, but saturated by application of fresh outer layers from time to time. Linen soaked in a mixture of equal parts of lime-water and linseed oil also forms a good dressing. Common whitening is very good, applied wet and continually dampened with a sponge.

CARE OF GLOVES.—When removing gloves never begin at the tips of the fingers to pull them off; turn back the wrist and draw them off wrong side out. Before putting them away turn them right side out and smooth them out lengthwise. Never roll them up tightly, one inside of the other, as whatever moisture they may have gathered from the hands dries in this way very slowly and makes the kid stiff and hard. Strips of cotton flannel are good to lay between gloves. Dry cornmeal will clean gloves nicely, but if much soiled it is better to send

them to a reputable cleaner. Benzine will clean white gloves, but it is not to be recommended where there is any color. Where black kids have become rusty about the finger ends they can be restored by adding a few drops of good black ink to a teaspoonful of olive oil and applying with a feather or camel's-hair brush.

TESTING EXTERIOR STAINS.—Since the use of stains for exterior work became so general, several stains, some good and some bad, have appeared on the market, so that a few points on estimating their comparative values may not be amiss. The nose, and, to a less degree, the eye, are admirable allies for this work, but unassisted are not infallible. The following is about the simplest method of testing: 1. Search for kerosene by warming and then noting the smell. Also, note the thinness and lack of covering-power which kerosene causes. Kerosene is simply a cheapener. 2. See how fine it brushes out on a smooth shingle. There should not be the slightest grit or any perceptible grains of pigment, the presence of which will prove that the coloring was mixed dry with the vehicle and was never ground fine. 3. Pour out some of the stain in a tumbler. If it begins to settle at once, except in the case of a chrome-yellow or green, it is made as above stated, by mixing a dry paint with the vehicle, and therefore should be avoided. A well-ground oil stain tested in this way held up a whole day, and a oresote stain a day and a half. Of course, when debating between two stains, it is best to try them side by side. In such a case the comparative color-strength may be determined by diluting equal quantities of both stains of about the same shade with equal quantities of turpentine and then applying the diluted colors to wood and noting the depth of color. One part of stain to ten parts of turpentine is a good strength. A wise precaution is to conceal the fact that the samples are for trial, as the makers, so far as known, are mortal. They should be thought by some one not known as an architect.

ARTIFICIAL SILK.—Artificial silk is the latest discovery, and judging from the details of it that are to hand, it seems likely that the silk-worm's occupation will soon be gone, and that he may retire to his cocoon and lament his lost importance in silence. The new material is made, we are told, from a kind of collodion, to which has been added perchloride of iron and tannic acid. The process of manufacture is somewhat complicated, but the result seems to be all that can be desired in the way of providing a substance practically equal to good silk.

LANGUAGES.—It has been estimated by Professor Kirchhoff of Halle that the language most spoken on the globe, for the last thousand years at least, is Chinese, for it is without doubt the only one which is talked by over 400,000,000 of the human race. The next language most in use, but at a very great distance behind Chinese, is Hindustani, spoken by over 100,000,000. Then follow English (spoken by about 100,000,000), Russian (over 70,000,000), German (over 57,000,000), and Spanish (over 47,000,000).

A PECULIAR DEPOSIT.—A peculiar deposit, which resembles clay in pliability, but which, when exposed to the air, becomes as hard as granite, has been discovered at the base of Bear Mountain, near Taylorville, N. C. Blocks of it have been dug out and used for all the purposes of stone with success, and it is proposed to build houses of it.

PRODUCE EXPORTS FROM SAN FRANCISCO for the first seven months of the year amount to \$18,829,000, against \$19,474,000 for the corresponding period last year. The imports in the same time were \$30,550,000, against \$25,052,000 in 1887. The imports of specie were \$1,834,000, against \$2,885,000 in 1887.

COLORS FROM COAL TAR.—About 150 colors are now obtained from coal tar, which have almost entirely supplanted vegetable and animal dyes. Indigo and logwood are the only two of the latter class considered of much importance.

EXTINCTION OF BIRD SPECIES.—The statement is made that no less than six species of North American birds have become extinct during the last 10 years, and it is claimed that English sparrows were the main cause.

EFFECTS OF SACCHARINE.—A constant and disagreeable sweet taste in the mouth has been reported as a result of saccharine, this new concentrated sweetening material.

ZINC AND QUICKSILVER.—A new process for amalgamating zinc and quicksilver without the admixture of any other material, it is stated, has just been invented.

There is one admirable feature about a wire fence. The patent-medicine man can't paint a legend upon it in regard to his liver cure.—*Puck*.

The organ was invented by one Ctesihus, a barber of Alexandria, about 100 B. C.

There are 130,000 liquor saloons in England, 20,000 of which are in London.

The first notice of aurora borealis in England was on March 6, 1716.

Rewards for New Gold-Fields.

In the colony of Victoria, Australia, rewards are given for the discovery of new gold-fields. The person is considered the discoverer who first finds gold, marks out a claim, and notifies in due time the warden or police magistrates of the district. No rewards exceed \$5000. In fixing the amount to be paid for any discovery, regard is had to the number of men employed in the new gold-field, its distance from the nearest gold workings, the character of the deposits in which the gold occurs, and the depth of sinking. If two or more persons simultaneously discover gold in the same locality, in a place immediately adjacent, and they each severally comply with the conditions, the sum to be awarded is divided in such a manner as is just.

Rewards are given in accordance with the following scale:

A. For the discovery of a gold field distant more than one mile and not exceeding two miles from the nearest gold workings, and on which there shall be employed three months after the report of the discovery having been made not less than 200 men, a sum not exceeding £200.

B. For the discovery of a gold field distant more than two miles and not exceeding three miles from the nearest gold workings, and on which there shall be employed three months after the report of the discovery having been made not less than 200 men, a sum not exceeding £300.

C. For the discovery of a gold field distant more than three miles and not exceeding five miles from the nearest gold workings, and on which there shall be employed three months after the report of the discovery having been made not less than 200 men, a sum not exceeding £400.

D. For the discovery of a gold field distant more than five miles from the nearest gold workings, and on which there shall be employed three months after the report of the discovery having been made not less than 200 men, a sum not exceeding £500.

E. For the discovery of a gold field distant more than five miles from the nearest gold workings, and on which there shall be employed six months after the report of the discovery not less than 500 men, a sum not exceeding £1000.

San Luis Obispo Oil.

Notwithstanding the depreciating remarks of sundry doubting Thomases and smart Alcks, who are stout in their opinion that the efforts which have so far been made to reach the deposit of petroleum, which it is believed underlies this part of the country, have resulted in nothing, there is a good deal of stir on the subject. We learn of quiet efforts to get hold of land deemed hopeful for exploring purposes, and it is quite certain that if any positive discoveries are made, at the first appearance of oil in promising quantities, a good deal of capital will be devoted to following up the matter. Several tracts have already been bonded, we understand, among others, 1000 acres of the Grover and Gates tract at Pismo, for \$50 an acre to Los Angeles parties, and certain tracts in Oak Park. Judge Adams tells us that the product of the Carpenter well has been submitted to Los Angeles experts who assert that it is the genuine article of green oil and of fine quality. There is, of course, the element of doubt as to the extent of the deposit, but there seems no reason to suppose that there can be any wide difference between this section and that a few hundred miles south; the character of the country and the indications being so nearly identical. A story is reported of a Standard Oil Co.'s agent who was anxious to make a personal inspection, a day or two since, and after receiving instructions as to his route, etc., departed. A few hours later he returned in a state of astonishment at the developments. It was one of the biggest things he had ever seen; oil in any quantity, and as for quality, why, he touched a match to it and the flames flew six feet in the air, burning his wrist quite severely. This surprising piece of news drew on a cross examination, from which it appeared that the stranger had been steered to the Miles Station Oil Well, instead of to Mr. Carpenter's new development.—*Tribune*.

FINE MINERAL REGIONS.—Following are said to be fine fields for the prospector who possesses the advanced knowledge of the present day in geology and mineralogy: Silver Zone district, in the Steptoe range of mountains; Buel district, south of the Central Pacific, on the Utah line; Delano district, northwest of Tacoma; the Goose Creek range and Mount Merritt, 16 miles north of Mountain City. In all these districts some prospecting work was done 15 or 20 years ago; in all more or less paying ore was found, and in a few, as Buel district, paying ore was extracted and worked. At the time these districts were discovered and organized the explorers were all men of small means; they had pushed out too far from the base of their supplies and had left the capitalists hundreds of miles behind. At that time it was a very difficult matter to get a man of capital further into the country than the Comstock. The man who pushed out into the regions in the wilds in the early days soon found that the times were not ripe for the opening up of mines in far-away fields. When the small means they themselves possessed were exhausted they were obliged to strike back into the settlements and civilization; they could not induce ones of capital to go out into the wilderness.—*Virginia Enterprise*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR GOLD MINE.—*Ledger*, Aug. 18: A rich strike was made in this mine a few days ago. In running a drift west, they struck a small vein of quartz, about six inches thick, which is included in a main ledge 20 feet wide. This seam is sprinkled with free gold. It has been followed a distance of nearly 20 feet, and the ore shows gold visible to the naked eye all the way. Such rock ought at least to yield \$100 per ton. A change of foreman has again taken place. Mr. Pearce left for San Francisco early this week, and George Francis from Grass Valley, and who eight years ago was foreman of the Zule, has taken his place. Preparations are being actively pushed for the erection of the 60-stamp mill. The grading is about completed, and a quantity of the lumber is already on the ground. The mill will take something like 400,000 feet of lumber, and several sawmills are engaged in filling the order, as the quantity is too much for any one mill to cut in addition to other work.

MISCELLANEOUS.—Nearly 20 men have quit work at the Kennedy within the last week or two. It is said the cause is the fear of a cave in the south drift at the 700-foot level, where most of the ore is being extracted that supplies the mill. The men say that the signs in that portion of the mine point to a probable cave, and quit rather than run the risk of working there.

PROMISING.—*Cor. Amador Ledger*, Aug. 18: The Leggett & Manditch claim, that has lately been discovered about six miles above here, continues to look very promising. They have commenced sinking, with the intention of going down 200 feet, and if the prospects at this depth are as good as at present, they will be justified in putting up a ten-stamp mill.

Butte.

QUARTZ MINING.—*Oroville Register*, Aug. 16: A new era in quartz mining has dawned upon Butte. Ledges are being developed at Forbestown, Merriam Mills, on French creek, near Magalia, at Oregon City, near Oroville, and in other sections. Not less than 150 men are at work on quartz, either prospecting or getting out ore. Extensive developments at Forbestown show rich ore, and a large force of men is working to put the mines in the best shape for good returns. Farnham & Rowell's mine, near Merriam, shows fine ore, and a new ten-stamp mill will commence crushing it this week. A good deal of work is being done at the Banner mine up the river from here and excellent ore development is reported. A large amount of prospect work is being carried on in the county and several new ledges have recently been found.

Calaveras.

DURYEA GOLD MINE.—*Calaveras Chronicle*, Aug. 18: This mine, being one of the oldest on the line of the Mokelumne and Campo Seco canal and running water steadily, has the preference over all other mines when the water becomes scarce. This for a number of years was worked as a hydraulic mine. Several acres of ground were washed off the east and west rim, from which it is estimated over \$500,000 was taken out. The bank then being about 150 feet in height, dump for tailings filling and bedrock pitching below the grade of the flume, made it difficult, if not almost impossible, to bottom the channel by hydraulic process, in consequence of which, during the last three years, the claim has been worked as a drift mine. A long, deep drain was cut through bedrock and boxes placed in, which at the time was thought to be low enough to drain the whole mine. A tunnel was also commenced and the drain carried with the tunnel. After getting in some 400 feet the bedrock pitched below the drain. Then the main tunnel was run on the east rim of the mine on a level with the drain for about 2000 feet, all through pay gravel. A five-stamp mill had been erected, and feeling anxious to run the mill steady, a crosscut on the same level was run to the west for 300 feet, which was supposed to be about half-way across the channel, as where the surface had been removed by hydraulic process the rim from east to west measured about 700 feet. Breasting back was commenced on this tunnel with good results. At the same time No. 2 tunnel was started off the main tunnel, 50 feet from the No. 1. All tunnels were run 300 feet in and 50 feet apart; breasting back 25 feet on each side, and working the gravel 14 feet high in two lifts from the present water tunnel level, leaving the best pay and coarser gold under foot. Mr. Duryea showed us some chunks of gold that came from gravel taken under foot below his tunnel level. This gravel was taken as a test, and supposed to be 8 or 10 feet from the bedrock. The chunks showed us averaged all the way from \$5 to \$80 each. The mine is well opened, having at present over 1800 feet of tunnels. There is also a tunnel in over 500 feet on the west rim, and when needed will crosscut the old works down from the east rim tunnel. The mine employs from 20 to 25 men, and about 40 tons of gravel are crushed daily with a five-stamp mill. The gravel is hauled off by mules.

ANGELS.—*Cor. Calaveras Prospect*, Aug. 17: Angels is enjoying good and prosperous times, and there is every reason to believe that the present prosperity is something permanent. Capital is taking hold of all the best mines and prospects for the purpose of making complete developments, and the outlook for valuable results is certainly fair, and could not be better without being extraordinary. Water has become low and in consequence some of the mills have shut down temporarily. We learn that a run of little over half a month in the Ulica resulted in a recent cleanup of about \$700. Vast improvements are noticed about this mine, now the property of Hayward & Hobart. This company is digging a new mining ditch, which will extend some distance above Murphy's, yet when completed will be shorter than the old ditch now in use. The Nevills mine is doing some blasting in the ledge of the old diggings in front of the schoolhouse. This mine is also looking well. Whether or not the G-Jid Cliff will ever start up again is an every-day conjecture; but it is believed that operations will be resumed in the fall. Andrew Lane & Co. have purchased the Matson mine south of the Gold Cliff, and the erection of a five-stamp mill is now going on.

Carson Hill and Robinson's Ferry are now exciting the closest attention from mining men. If the present indications are half realized, that locality will be before long undergo a great transformation from its dormant condition of to-day to one of the busiest activity, employing many hundreds of men in the extensive operations to be commenced hereafter. We hear that the London syndicate, about which so much was said some time past, will soon commence its work. The new mill of the Tryon mine has shut down for the want of water.

MURPHYS.—*Cor. County Record*, Aug. 15: Mining in this vicinity is progressing favorably. The Barattini mill recently erected on the Drussel and Heinsdorf mine, started up last week, and so far does the work satisfactorily. It is the invention of Mr. Stevenson of Douglas Flat. Mr. Barattini of this place is his joint patentee. The mill is five tons in 24 hours. Their capacity, however, is only limited by their size. The Norfolk Mining Co., which lately purchased the Morse and Stone group of mines in close proximity to Murphys, lying east of us, is working a large force of men, making preparations for the successful working of their property. Other mines in the district and adjacent to it are pushing work to successful developments, some of which bespeak for them rich returns. The Central Hill Gravel Mining Co. has tied up for the season, after the final cleanup. The growing scarcity of water was a reason for closing down. They contemplate running a tunnel to tap the vein at greatest depths.

NEAR MOKELUMNE HILLS.—*Calaveras Prospect*, Aug. 17: The A and B mine, What Cheer, Quaker City, Burleson, and others about Mokelumne Hill and vicinity, have closed down on account of the scarcity of water. The mines depend for water-power on the Mokelumne and Campo Seco canal.

HOISTING WORKS.—*Angels Echo*, Aug. 15: The work of building the new hoisting works at the Ulica mine is going on actively. Timbers are now being hauled from McKay's sawmill for the building of similar hoisting works on the south shaft.

El Dorado.

MILLING.—*Georgetown Gazette*, Aug. 18: The mill at the Alpine mine is running day and night and is crushing from 35 to 40 tons per 24 hours. Several of the owners were here this week, and we understand that an additional force of men will be put on. This company has not put on any of the unnecessary extras which many companies have to pay for.

TO START UP.—*Placerville Observer*, Aug. 21: The Tincup mine on Webber creek, we are informed, is to be put in operation in a few days. This will be good news to all, and especially to the miners. Bob Calvin starts in this week to lay the balance of the pipe by which the 10-stamp mill will be supplied with water.

SLATE.—The California Slate Co. is preparing to ship several carloads of slate. This is an industry the importance of which is scarcely realized by our people.

STILLWAGON.—O. S. Graves, superintendent of the Stillwagon mine, reports the outlook for that mine as decidedly promising.

Fresno.

GOLD, SILVER AND IRON.—*Mount Raymond Cor. Fresno Republican*, Aug. 16: The activity now being exhibited here by the Star Mining and Reduction Co. certainly looks as if we were now entering on an era of prosperity and good times. The company has just completed a first-class wagon-road from Fish's camp to the Big Springs, where they have commenced the erection of their reduction works, which they hope to have in operation before snow flies. The company will commence operations on their mine in a few days, extracting ore and making preparations to continue work all winter. Part of their machinery has arrived at Raymond station and will be shipped here as soon as possible. The operations of this company are very essential to the future success of the working of low-grade ores in this district as well as the State in general. Their system of concentration of low-grade ores will be the means of adding largely to the lead, silver and gold production of this State. The Star mine, for which the reduction works are being built, is situated near the summit of Mount Raymond, about one mile from the works. The ore is very abundant and lies in masses of considerable size and carries a large percentage of galena, which assays high in both gold and silver. There has always been a question among California mining men whether the ores of Mount Raymond could be successfully and profitably worked, but none of our energetic mining men having a personal knowledge of this character of ore seemed willing to undertake the demonstration of it. But in far-off Montana some practical men hearing of our large deposits of ore came here and were pleased at what they saw, and immediately opened negotiations for the purchase of the Star mine, formed a company and came here with the intention of building up a legitimate enterprise. Our iron deposits here are very extensive, and with cheap transportation they could be worked to a good profit. The Black Prince mine, located on our iron belt, shows a mass of iron over 20 feet thick, and the vein has been traced a distance of nearly two miles. It is hematite. It appears to be of excellent quality and is remarkably pure and free from intermixture with rock.

Placer.

STAMP-MILL.—*Grass Valley Union*, Aug. 21: Recently Hon. James G. Fair and E. A. Davis of San Francisco purchased the Pioneer quartz property, situated on Humbug canyon, a few miles east of Iowa Hill. The vein which is from 12 to 18 feet in thickness, has been opened upon by tunnel in several places, and a sufficient quantity of good ore uncovered to warrant the building of a mill. The owners have therefore determined to erect a 20-stamp mill now, and increase the capacity of the mill when the mine is more fully developed. The contract for the construction of the mill has been awarded to Rix, Firth & Pitchford, proprietors of the Phoenix Iron Works, San Francisco. The mill and other works are to be built according to specifications drawn by J. B. Pitchford, the well-known mining machinist, who made the specifications for the North Star mill of this district, than which there is no superior mill in the State. The Phoenix Iron Works has sub-contracted for the erection of the machinery and buildings with Wm. S. May of Grass Valley, who as an excellent millwright has a

wide reputation. The mill is to be located 3000 feet from the main tunnel on the Pioneer vein, and about 1000 feet below it. There will be a tramway about 3000 feet in length, laid with railroad iron, and cars of two or more tons capacity will be used for transporting the ore to the mill. These cars are to be self-dumping, and the loaded cars going down will pull up the empty cars. Water-power will be used for running the mill, with a pressure of 600 feet, and separate wheels will be used for the battery, concentrators and rock-breakers. The pipe line (12 inches in diameter) will be 1500 feet in length. The work is to be completed and the mill in running order in 90 days from this date.

PROSPECT.—*Placer Herald*, Aug. 18: E. P. Floyd is running a tunnel about a quarter of a mile below the Stonehouse, on his quartz lead. He is in 30 feet and is getting a good prospect.

Nevada.

GRANITEVILLE MINING NOTES.—*Grass Valley Union*, Aug. 17: The Rocky Glen mill, in Graniteville district, is running night and day on ore from the mine, which is showing well. The lower tunnel in the Baltic mine we hear has struck a two-foot ledge, but we could get no further particulars. The California tunnel, near Graniteville, struck a four-foot ledge last week, but the work is being extended to that ledge, which will require about 50 feet more to be run. The back ledge is the one Mr. Foley has been working on since he took charge of the mine. The rock in the front ledge where the tunnel struck it, looks well, but none of it has been crushed yet.

MINE BONDED.—*Nevada Transcript*, Aug. 18: Myron Foote has bonded the East Banner quartz claim at this city to Walker Bros., the well-known bankers of Salt Lake, U. T., for a period of 90 days. R. G. Lansing, expert for the Walker Bros., is now here examining the property, and if his report is favorable his principals will immediately begin prospecting operations and push them with all possible rapidity.

San Diego.

HIGH PEAK.—*Julian Sentinel*, Aug. 17: The High Peak mine is again in a presentable shape. The dirt which caved in at the mouth of the tunnel has all been cleared away and new timbers put in, and ore showing free gold is now being taken out. The ledge in this mine varies from 16 to 33 inches in width, and is considered the best in the camp.

MAGAZINE.—The work of sinking the shaft at the Magazine mine was resumed Tuesday morning. The shaft is at present about 23 feet deep, and when a depth of 30 feet is attained, a drift will be run to the ledge.

Shasta.

LOWER SPRINGS MINES.—*Cor. Redding Free Press*, Aug. 18: It is every miner's duty to advertise the mines of his district, the same as any other legitimate business. There are as good surface croppings in our camp as can be found anywhere; this we know by our surface scratching. If our ledges are rich in gold quartz on the surface, they must be also rich as they descend into the earth, or in other words, as far as the gold solution extends. All our fissure veins here have characteristic features of some of the richest mines in California. All the surroundings point to some very rich gold mines, but our present generation will not find them unless capital comes to their relief. The best mine we have here is now lying idle. What for? Not for the want of capital, nor for the want of good ore or water to run the mine. What for? It is to be hoped that this company will soon resume operations and prove a great bonanza; by this means giving a new impetus to mining in this old district.

MAMMOTH.—*Courier*, Aug. 18: Frank Panter was in town Wednesday, and says the lower tunnel run in 150 feet below the old one to tap the great Mammoth lode, is now in about 200 feet, and 35 feet in good quartz. How wide the ledge will prove to be when cut through can now only be guessed at. Enough is already disclosed and known to prove that the Mammoth is one of the most extensive and valuable ore bodies in the State. The mine and quartz shows for itself, and the stacks of 320 pieces which the rock brings when reduced are witnesses whose evidence cannot be impeached.

SOME RICH ORE.—*Sacramento Record-Union*, Aug. 19: Under Sheriff B. N. Bugbey has returned from the Little Nellie mine which he purchased lately, bringing with him a large quantity of ore which was taken from a four-foot ledge on which his men are now at work. He says that specimens of rock were taken in a single strip across the vein, showing that he has struck a very fine body of ore. It works easy and the assays which have been made show it to be exceedingly rich. There is a fine water-power at the mine.

Siskiyou.

STRIKE.—*Yreka Journal*, Aug. 22: We learn that the richest strike in quartz yet found in this section was made last week by a prospector named Big Tom, who has been at work lately for the Hamilton boys. His rich find is on the north fork of Humbug, below the site of the old Eliza mill, the quartz being so thick with gold that it is very difficult to pull it apart after smashing the rock. The finder sleeps on the ledge to prevent parties from taking off any of the gold belonging to him. This is the fourth rich ledge found on Humbug this season, one by Simmons, another by the Hamilton boys, and another by Aldrich and Woods. The ledge of the Hegler boys and Bruce Aldrich is also turning out very rich, with plenty of quartz to keep their mill running steadily. The Humbug creek hills are full of prospectors, and much excitement prevails in reference to the rich finds lately discovered all over the Humbug district, including Klamath river on the north and the Deadwood creek section on the south.

Trinity.

EAST FORK MINES.—*Cor. Trinity Journal*, Aug. 18: The town of North Fork is lively. Many prospectors are coming and going, and you can hear the ring of the anvil, early and late, forging mining tools for the East Fork gold-seekers. A look at the Ozark mine on Rich gulch, East Fork, owned by John Day, discloses the fact that it is on a paying basis. Mr. Day has a force of men engaged in taking out ore, and the arastra is kept running day and night on \$125 rock. At a depth of 90 feet the ledge is 18 inches wide and is rich in free gold and sulphurets. The mines owned and controlled by Capt. Truworthy, known as the Orland, Fountain Head, Grizzly, Bell, and others, are looking well.

The captain has a force of men at work on each of the mines, and the more work is done the better the ledges develop.

THE THANKSGIVING MINE. owned by Bergin & Co., is being worked and good ore taken out. There are several tunnels run on this mine, the lead has been struck in all of them, and the ore proved to be of good quality. Barney gulch, tributary of East Fork, furnishes a sufficient supply of water to run a 100-stamp mill through the entire year. Work on the Enterprise mine is going on steadily with good results from the rock crushed. The arastra is kept running constantly, and ore is being piled up on the dump in large quantities. The Lone Jack, Poor Man, North Star, Crown Point and other locations too numerous to mention, lying around the Enterprise, and prospecting from \$20 to \$500, are not being worked at present for want of capital with which to properly develop them. W. T. Coleman, one mile above this group, has a fine and well-developed ledge ranging from 4 to 12 feet in width. Joe Watrous and Smith, the only placer miners on the creek, are patiently waiting for rain. The Davis brothers have made a new discovery on the Yellow Jacket. They have struck a fine lead of gold-bearing quartz three feet wide which prospects from wall to wall and will go about \$75 to the ton in free gold. The sulphurets are very rich in both gold and silver. They are now running a tunnel to tap the ledge. Still farther up the creek John Day has discovered a lead of quartz varying from 6 to 14 feet in width, and it can be traced for 700 feet by the croppings. It prospects at least \$35 per ton. The Mammoth, discovered by James Haley, lies between the Yellow Jacket and East Branch. The ledge is from 8 to 24 feet in width and prospects \$25 per ton.

Tuolumne.

QUARTZ.—*Sonora Democrat*, Aug. 18: Messrs. Allen & Shore are doing well in their pocket mine at Blue gulch. The Soulsby mill at Soulsbyville is crushing quartz from the Laura mine. This is a small lode, but the ore is rich in free gold and sulphurets. Allen Orcutt and partner at Blue gulch took out several hundred dollars lately. Chris. Drescher and Elias Dunaway have struck it big down at Blue gulch. Two weeks ago they had taken out over \$3000. They are still doing well. The Dickson Ranch mine (the Lane mine) has attained considerable depth; therefore it was found necessary to put a pump in. This week a Cornish pump was placed in the shaft. In a short time now if the lode continues its present developments, Mr. Lane will erect a ten-stamp mill. The Donella mine, situated near the North Fork of the Tuolumne river near Summerville, has passed into the hands of a St. Louis company of large means. The Black Oak mine is doing well and the work of development goes steadily on. The water reached the mill Thursday. The mill is now practically proof against all natural conditions that may tend to stop operations. Should the water fail in the fall, steam will run it as heretofore. The hoisting works will soon be in operation. They also will be run by water-power. Mr. W. G. Scott reports that the main chute is 300 feet in length and will average 3½ feet in width. A cleanup was recently made, and we are told that it was highly satisfactory.

TO START UP.—*Tuolumne Independent*, Aug. 18: The Bonanza will soon start up again under a long lease. A new 16-horse power engine has been purchased, and it is proposed to work the famous old mine for all it is worth. Messrs. Oliver, Johnson, Dart, Harriman and others are said to be the lessees. This has been the richest pocket mine ever discovered in the world, and there is no doubt but what she still has plenty of pockets around her old clothes, with plenty of money in them.

DISCOVERY.—Mr. S. H. Teeters has discovered a ledge of rock near the old Teeters mine, a short distance from Sugar Pine, that promises rich yields. As it is, every pound of rock taken out was worth two bits, while it continues to get richer, and the vein larger, with every foot of development.

NEVADA.

Washoe District.

CONFIDENCE.—*Virginia Enterprise*, Aug. 18: General repairs throughout the mine are still going on. Are shipping daily to the Brunswick mill for reduction 160 tons of ore, the average battery samples of which show a value of \$26.41 per ton.

HALE AND NORCROSS.—During the week have extracted 638 tons of ore from the 600 and 700 levels, and have shipped to the Nevada mill 615 tons. The average of the battery samples was \$42 per ton. All the stopes continue to look very well. The west drift from the 500-foot station has been advanced 55 feet. We have men on repairs in the main shaft and prospecting on several levels of the mine. We have bullion on hand and previously shipped amounting to \$36,000.

GOULO & CURRY.—*El Dorado tunnel*: The south drift from west crosscut No. 2 has been extended 23 feet. Face is still in good milling ore. The upraise 45 feet south of No. 2 crosscut has been carried up 17 feet; total height, 52 feet. The top is in quartz with streaks of good milling ore. During the week there has been extracted from the 250 and 300 levels and shipped to the Douglass mill 150 tons of ore, the average battery assay of which was \$29.25 per ton.

ALTA.—Extracting the usual quantity of ore from the 825 level, and the mill machinery is running smoothly. The Keystone machinery is also running well, and sinking to crosscut with the upraise from the 695 level has been resumed. Are opening a new station in the Alta and running a drift to the west to cut the vein on the 725 level.

CHOLLAR.—The north drift from the 650 level has been advanced 22 feet during the week; total length, 300 feet. The character of the ground is the same as last reported, being a mixture of quartz, clay and porphyry, with occasional bunches carrying some metal.

SAVAGE.—Owing to a lack of milling facilities shipments of ore from the Savage mine have been discontinued, and no stopping is being done in the mine. They are now making necessary repairs to the vertical shaft.

CROWN POINT.—The south drift from the 700 crosscut is in 27 feet in a mixture of clay and porphyry, with a little quartz exposed on the west side.

BELCHER.—The 500 crosscut is now 261 feet in. No change in the ground since last report. Have now drained and cleaned out the 850-foot station

and are engaged in putting in guides in the middle compartment.

ANDES.—From the west drift on the 350 level are now going north in a streak that looks promising, yielding a little ore. Are going south on the 240 level from the west crosscut on a streak that is looking well.

BENTON.—Continuing the drift on the 700 level and cleaning out the 800 level drift, preparatory to the resumption of explorations on that level.

OCCIDENTAL.—Extracted 103 tons of ore, and shipped to the mill 125 tons, the average assay of wagon samples being \$28 per ton.

POTOMAC.—The south winze on the 550 level has been sunk 15 feet the past week; total depth, 43 feet. This winze is all in low-grade quartz.

WEST YELLOW JACKET.—Expect to make a connection early next week; this will give good air and expose a seam of high-grade ore.

CHALLENGE CON.—General repairs throughout the mine and prospecting work on the 100 level are going on.

CONSOLIDATED IMPERIAL.—Repairs to the main north lateral drift on the 1100 level are still going on.

JUSTICE.—Are hoisting about 15 tons daily, and have about 2500 tons of milling ore on the dump.

BULLION.—Are drifting south on the 640 level and crosscutting east on the 500 level.

BALTIMORE.—Are crosscutting in the ledge on the 338 level.

Hawthorne District.

LAPANTA ORE.—*Esmeralda News*, Aug. 18: One hundred and sixty-five tons of Lapanta ore were crushed at the Kinkead mill last week, from which was produced a bar of gold bullion valued at a little over \$10,300. In most mining districts ore working \$53 per ton would be considered high grade, but here in Hawthorne mining district, where ore worth from \$550 to \$3000 per ton is being extracted daily, that class of ore is termed second or low grade. The 165 tons of Lapanta ore spoken of was the last of the lessee's work, and the high and low grade was mixed as a final cleanup.

A GENERAL COMPLAINT.—As a matter of course, whenever a prospector comes in from the mines he is asked how his prospects are looking and whether he has any ore out; the answer received in nine cases out of ten is that he has considerable low-grade ore on the dump, but that on account of the exorbitant expense connected with hauling and working the same he can do nothing with it. What a benefit reduction works would be to these hard-working men if erected in this vicinity. As it is at present, ore that will not work over \$35 per ton is of no use to the prospector, for after paying for hauling the same from their mines to the railroad depot, thence to the reduction works at Dayton or Reno, the charge of working it and the discount on bullion, there is nothing at all left to pay him for the labor and money expended in extracting the ore. There are no better advantages for investment offered than in the erection of suitable reduction works to work the ores of Hawthorne and adjoining districts.

Lodi District.

SHIPPING ORE.—*Belmont Courier*, Aug. 18: Alfred Welsh is making regular shipments of high-grade ore from the Illinois mine to the Selby Smelting Works, S. F., for treatment.

San Antonio District.

LEACHING.—*Belmont Courier*, Aug. 18: A. B. Eastwood is running his leaching works on ore from the New Year mine with but indifferent success. The ores of this mine will have to be roasted before they will leach properly.

Tuscarora District.

DEL MONTE.—*Times Review*, Aug. 17: No. 1 winze from tunnel level has been sunk 23 feet. The vein is large and regular and there is an improvement in the grade of ore.

COMMONWEALTH.—100-foot level: No. 2 south drift from east crosscut has been advanced eight feet, the face showing three feet of good ore. The crosscut started from the main south drift 130 feet south of the shaft has been stopped. 150-foot level: North drift from No. 1 east crosscut has been advanced 13 feet without change, and No. 1 north drift from west crosscut has been extended 20 feet in very favorable formation. A crosscut has been started from main south drift 130 feet south of the shaft, to open up the ore found in the 100 foot level directly above. This crosscut has been advanced 17 feet. No. 1 winze has been sunk 14 feet; total, 81 feet. The ore is high grade and exposed five feet wide; it is still wider, but the winze did not take the full width. The east lateral has been extended 14 feet, with fine ore still in the face. Very high grade has been extracted in driving this drift.

NEVADA QUEEN.—Average assay from the battery pulp for the last week, \$209 per ton. The usual progress has been made in 450-foot level, the vein widening but not so high grade. Two hundred and sixty tons concentrating ore have been hoisted during the week. Average assays taken from car samples, \$26.39 per ton. Bullion shipped, \$8,116.25. Mill running all right and doing good work.

NAVAJO.—North drift from No. 2 winze on east vein, 250-foot level, has been extended 10 feet. The vein shows a fair width of high-grade ore. South drift on west vein, 150-foot level, extended 10 feet. The stopes above the 350-foot level are opening out well in both grade and quantity of ore.

GRAND PRIZE.—Stopes above the 200-foot level show a large vein of ore, but of lower grade than heretofore. The 300-foot level stopes are yielding a good grade of milling ore. The mill is running all right.

NORTH BELLE ISLE.—The workings in the south stopes, 300-foot level, are yielding the usual amount of high-grade ore. Good progress is being made with the work on the concentrating plant.

FOUND TREASURE.—The water has been lowered to within five feet of the top of the 200-foot station.

BELLE ISLE.—The stopes above the 250-foot level are yielding the usual amount and grade of ore.

Willow Creek District

LOOKING WELL.—*Silver State*, Aug. 16: Vance Nelson, who has been prospecting in the Willow creek mines lately, reports that McKenzie & Wilson's mine is looking well and they have a car-load of ore ready for shipment. Professor Thompson has a force of men working on his new mill, but the water in the creek is so low they will not be able to run it before late in the fall.

ARIZONA.

VARIOUS CAMPS.—*Prescott Courier*, Aug. 16: Mr. Williams, superintendent of Copper Basin, is, we learn, fixing foundation for smelting works. In digging for the same, the workmen struck ore that assayed 30 per cent copper. This is at least what we have heard. A mining man who recently visited the Basin says it is a wonderful place. A great depression in the mountains filled with deposits of copper; indeed copper ore is found almost everywhere in the Basin and surrounding hills. Fluxes are, however, said to be scarce, but prospectors will undoubtedly find them. The Basin is about 13 miles from Prescott, just across the Skull valley divide. Wm. Dulin and partner have a water-wheel and plenty of water to run it in Walker district. They have, too, a pretty good-sized vein of rock that assays about \$116 per ton in gold. They will arastra the richest of it and ship second-class. Henry Dupre has just shipped several tons of very rich silver ore from his mine, which is near Cordes station, on the Prescott and Phoenix road. Douglas Gray from lower Big Bug tells of profitable mining. We have cheering news from Walker district. The Amulet mine continues to produce ore that pays well to ship. Mr. Moore is now sole owner. G. G. Henderson arrived at the ore works recently, with a wagon-load of good silver ore. He says that John F. Blandy is working his mine with six men and that it is a fine mine. N. L. Griffin is shipping ore to Van Name's mill. H. M. Hughes has put men at work on the Ground Hog and Wedge mines. He recently visited Upper Big Bug and praises Van Name's mill. His son-in-law, Robt. Cartnell, has a force of men working the Sterling and is getting plenty of ore that assays \$128 per ton in gold. Riggs & Lawler are making regular shipments of the very richest kind of silver ore from their Hillsdale mine. The ore is hauled over 100 miles in wagons. Mr. Thompson, superintendent of the United Verde copper mines, and Ed Austin have been examining mines in Hassayampa district, and saw a great deal of rich ore in Bigelow and Smith's camps, at Dan Hat's and elsewhere. There is in this section a company of Italians who are making money fast, arastrating gold rock. The heavy rains will enable placer miners to start their sluices, and the *Courier* is not afraid to say that the fall mining season in this part of Arizona will be the most satisfactory of any we have had in the past decade. F. M. Murphy, the energetic superintendent of the Congress mine, is working a large force of miners and making regular shipments of rich sulphurets. Heavy shipments of copper-silver bullion are almost every day being made from the United Verde smelters. Mr. Kelly brought in yesterday a wagon-load of ore from the Blue Dick mine, Hassayampa district, and stated that a 15-ton shipment will soon be made. Dos Oris, in same camp, is producing rich silver ore.

MOHAVE MINES.—*Miner*, Aug. 18: There is a lot of ore from the Sunlight mine on the ore platform, which will be shipped to Pueblo, Colorado. Messrs. Morrissey & Winston have given up their lease on the Oro Plata. The ore is of too low grade for profitable working. The ore streak in the raise in the Night Hawk is improving and every miner who looks at it is satisfied that it is a very rich body of silver ore. John K. Mackenzie has started the pumps on the Cupel and will clear the lower levels of water. Fourteen men are now at work on the mine and ore shipments will soon be resumed. The outlook for Stockton Hill was never better. Judge J. M. Murphy and his force of workmen returned from the McCracken mine on Saturday last. The mine opened out better than was expected and samples taken from it assayed as high as 300 ounces. The McCracken is known as a low-grade property.

COLORADO.

THE SAN JUAN COUNTRY.—*Silverton Miner*, Aug. 14: The Columbia is indulging in regular shipments. Wm. Maroney, Abe Appel & Co. are working the Green Mountain mine on a three-year lease. The Gray Eagle will soon be ready for a large output. Drifts are being run on the ore body and stopes opened up. The Sailor Boy is being worked this summer by the owners. They have also located a claim farther down the gulch and getting some fine-looking ore therefrom. The Mountain Queen is in ore, low grade at present, but it is thought a rich streak will be found near the hanging wall. The Whale stamp-mill is completed, with the exception of a few finishing details, and will be started up between the first and last of next week. Alonzo Smith, a practical millman, is in charge, which insures success. George Gilton has a force of men working the Ready Cash mine in Cunningham gulch. A fine grade of ore is being taken out. Gladstone is receiving another gold boom and prospectors are scouring the hills in search of quartz. The west side of the south fork of Cement is receiving especial attention, and some very flattering finds have been already made. The Dives mine was sold last Saturday by Mrs. M. E. Ingersoll to Theo. Benovsky and M. V. B. Wason for \$4000 in cold cash. The mine is in Arastra basin; has a very large body of lead ore in sight.

CRESTED BUTTE.—*Elk Mountain Pilot*, Aug. 18: We can notice an appreciable improvement in mining for this vicinity. Work at first seemed slow starting up this season, but now that the season is advancing, the work is increasing, and aside from mere assessment work, many prospect-owners are letting contracts for 50 and 100 feet of development. While there is not as much work being done in some directions as we would like to see, still what is being done is proving satisfactory to the mine-owner. The Hawkeye Mining Co. is very anxious to build a concentrator at Pittsburg. We would suggest that they go to work in the mine and produce some ore before they undertake to build a mill. It is the utmost folly to build a mill before there is any ore produced. The Augusta mine needs a concentrator, because it has dump ore the accumulation of several years' work. Not so with the Hawkeye, because there is no ore produced. Creller, Carey & Bradbury are working the Grasshopper and taking out some of the most solid copper pyrites to be seen in the country. Miller, Jones & Houser are working their claim near by and sacking copper and galena ore as fast as they can shoot it down. Millrun tests show 25 ounces silver, three-tenths ounces gold, 14 1/2 per cent copper.

CONCENTRATING AT LEADVILLE.—*Mining and Scientific Review*, Aug. 16: A new concentrator is being erected on the Wolfstone mine at Leadville,

its capacity is to be 200 tons every 24 hours, and when completed will be one of the largest concentrating plants in the State. There is an immense dump of low-grade ore on the mine. It seems to us that this is to be the solution of a great problem, not only in Leadville but in all the great mining districts, especially the San Juan country and all others remote from markets. A very large proportion of the gross product must necessarily remain in camp because the grade is too low to bear the cost of transportation over the mountains. But by concentrating, the product can be shipped and yield material profit. The dumps of every district that have been effectively worked for a term of years contain vast sums of money, and there is no way to reach it except by washing out the worthless material. The conversion of six, eight or ten tons of crude ore into a single ton will supply new sources of wealth.

DAKOTA.

A SUCCESS.—*Deadwood Pioneer*, Aug. 16: The Merritt-Bullion smelter appears to be an unqualified success. Dan Brown, in Iron Galena yesterday, reports that when he left at eight in the morning, some 27 bars, a little more than one ton of bullion, had been run out. No further advices were received during the day, but as everything was working smoothly, indications are that the fortune of the enterprise is no longer a question of doubt. John Baker goes over to-day, and will probably be able to furnish a fuller report upon his return this afternoon.

FLOAT.—Little or nothing new can be reported of the Deadwood Reduction Works. A large force of men is still employed on the road, which is rapidly nearing completion. Work on the walls likewise progresses most favorably. John McVean and Dave Short came down from Ruby Hill yesterday. Recent developments have been flattering. A solid body of pay ore, of unknown dimensions, has been struck in the shaft. It will be followed, and if holding out as it promises, will shortly turn a flattering prospect into a paying mine. Good ore has been struck in the Double Standard, adjacent to the Tornado, Bald mountain. The stock is tightly held and in strong demand. Report of a remarkably rich strike in the Monarch reached Deadwood yesterday afternoon. The ore was described as free milling, and so filled with gold that small nuggets could be picked out with a penknife. Corroboration is awaited with more than ordinary interest.

IDAHO.

CENTERVILLE.—*Cor. Idaho World*, Aug. 17: If you want to see a booming little mining camp you must take a trip up Elk creek as far as the Elkhorn mine. Everybody busy and a vast amount of work is being done there. Hugh Turner will have his mill ready for crushing in three or four days. He has 12 men employed. Sweet, Williams & Smith, owners of the Gladstone, have their tunnel in 170 feet. The Oro Fino, owned by Mitchell, Bano and Naz Carpenter, is a very promising mine. Main tunnel in 325 feet and a vein of 25 or 30 feet more will tip the old Oro Fino vein at a depth of 150 feet. A raise from main tunnel to old works—85 feet—cuts through a body of talc and quartz seams 20 feet wide, which it runs through a mill would pay a handsome monthly dividend.

TUNNEL.—*Owyhee Avalanche*, Aug. 16: We hear that work has been commenced on the Bell Beck tunnel by the order of J. H. Brotherton, and that it will be continued until the same shall have been extended into and through the Poorman ground. The tunnel will strike the Poorman lode probably 600 feet deep, and will be used to run ore and waste dirt through as well as a drainage for the mine. It is not known just how far it will have to be run to accomplish the purpose above named, but not far. From this tunnel all the mines in the Poorman group will be worked at considerable depth. This is a move in the right direction and indicates the mining sagacity of the manager.

NEW MEXICO.

DEVELOPMENT WORK.—*Silver City Enterprise*, Aug. 17: A body of carbonates 12 feet thick has been found in the Big Hatchet mountains. The ores assay 12 ounces in silver. Water has been taken out of the Santa Rita mine to a depth of 240 feet, and Franklin Mahon secured a large pump last week, with which he expects to drain the mine dry in about four weeks. This valuable property will be put in shape to receive the benefit of the recent rise in copper. Arrangements have been made by the Deep Down Mining Co. with Peter Wagner for the surplus water made in his shaft—said to be about 40,000 gallons daily—giving them sufficient, with their present supply, to run the mill on full time. The extent of the ore chute has not been determined, but it would not take many tons of it to pay a good dividend. There is an abundance of low and medium grade ore to keep the mill constantly running.

MONTANA.

SMEITER IMPROVEMENTS.—*Anaconda Review*, Aug. 18: The Anaconda Co. has in contemplation the running of a tunnel 700 feet immediately north of the old works and on an incline up the hill 600 feet higher. The tunnel is to be 16x14 feet in dimensions, and its object is to take the smoke and fumes so far up the hill that they will not come down to the works at all. The plan works most successfully at the lower works, and when it has been carried out above, Anaconda will be perfectly free from smoke. The new boiler-house has been completed, and the new iron smokestack, seven feet in diameter and 200 feet high, has also been completed.

GRANITE.—*Phillipsburg Mail*, Aug. 18: There is but little news to report this week, other than since the shutdown and cleanup last week the regular output has been resumed, and the old reliable looms up with the following product for the week: The output for the week ending Aug. 15th was 35 bars of bullion, containing 60,877.90 ounces silver and 27.54 ounces gold.

SAN FRANCISCO.—In an interview with Mr. Kennett, president of the Sao Francisco, he expresses himself as being thoroughly satisfied with the outlook of the mine. Mr. Smith's reports have been perfect and everything is very satisfactory. They have laid off some of the men for the reason that

they cannot work to advantage in upper levels just now, as they are satisfied what their mine is, and that the ore can be taken out when desired, but it is poor policy to take it out and leave it on the dump. He says, however, that by next summer their mill will be completed, the site for which is just outside town limits, and they will develop a mine equal to any in the country. There will be no shutdown of the mine and no more men laid off.

BI-METALLIC.—Work at the mine is going ahead with great rapidity. They now have two pumps in operation and expect in another week to reach the big pump at the 500-foot level. Most of the lumber for the construction of the new hoisting-works is now on the ground and building will be commenced at once. Operations at the millsite are making the usual steady progress.

OREGON.

CRACKER CREEK MINES.—*Cor. Oregonian*, Aug. 16: Having just returned from the Cracker creek mines, I may be able to give some information regarding this section. The formation is principally of quartzite intersected with porphyry, with apparent surface condition favorable to rich and permanent ore deposits, and a thorough inspection of the Columbia and other mines now in process of development but confirms former reports of the merits of this mineral region. Over the divide from Cracker creek lies the late discovered district of Rock creek, and which is no doubt an extension of the Cracker creek belt. In this most promising region, yet in its infancy of development, I visited a large number of prospects in process of development, among which one in particular, the Forest City, deserves special mention by reason of its rich and well-defined showing and other characteristic features. The claim was discovered and located by J. P. Marlarkey, and the manner in which it is being developed reflects credit upon that thorough and efficient mining man. The Forest City has two distinct and well-defined veins, crossing at the surface with well-defined walls of quartzite and porphyry and contain exceedingly rich ore, predominating in gold, of which an assay has been returned from J. F. Cresmon, assayer of Baker City, yielding \$10,729 per ton. A contract was let by Mr. Marlarkey, and men are now at work in excavation, with the calculation of cutting the veins at a depth of 200 and 300 feet.

ROBINSONVILLE DISTRICT.—*Bedrock Democrat*, Aug. 16: The *Democrat* received a call yesterday from a gentleman who has spent the past month or two in examining the mines adjacent to the old placer-mining town of Robinsonville, about 45 miles southwest of Baker City, and from him we learn considerable of interest regarding operations at Greenhorn mountain and country tributary. Starting from Robinsonville, which is the center of this great mineral section, in any direction will be found locations of quartz, many of them undergoing extensive development and showing splendid indications. The more important section tributary is the Greenhorn mountain district, where considerable work has been done. The principal mines are the Vanderbilt, Jay Gould, Intrinsic, Invincible and Pride of Pendleton. An important sale of mines in this section occurred last week whereby 11 claims were disposed of to an Eastern syndicate for the sum of \$100,000. The Worley mine, owned by W. J. Wolfe of this city and J. Worley of Portland, is showing to be a valuable property. A small mill is crushing the ore and we learn that \$20 to the ton on an average is the yield. The Hagarty mine is being developed vigorously. The Red Man, J. H. Mitchell superintendent, is also giving great encouragement to the owners, and development work will be pushed during the fall and winter. A mill will probably be erected in the spring.

UTAH.

IN THE IRON RANGE.—*Cor. Salt Lake Tribune*, Aug. 18: I returned to camp last night from the Rio Virgin river, and learned from the miners that Messrs. Henry and Wilson have bonded the Decandia mine for \$4000 for 90 days. Some of Mr. Henry's assays of the Decandia ore run over \$800 to the ton. Mr. R. Young located a heavy ledge that assayed \$82. This is the first time this camp has looked like opening. There is plenty of room here for good prospectors, and with Mr. Henry in camp as an assayer, the camp will be tested for all that it is worth. Mr. Henry and Mr. Wilson went to Marysville for supplies and tools, and outfit to work on the Decandia and other claims now in their possession. There is but little doing in iron just now. There are 35 iron mines in the district, and we now say that they are mountains of iron. The Mount Baldy range and the Cave Mine range come in conjunction at this district.

WASHINGTON.

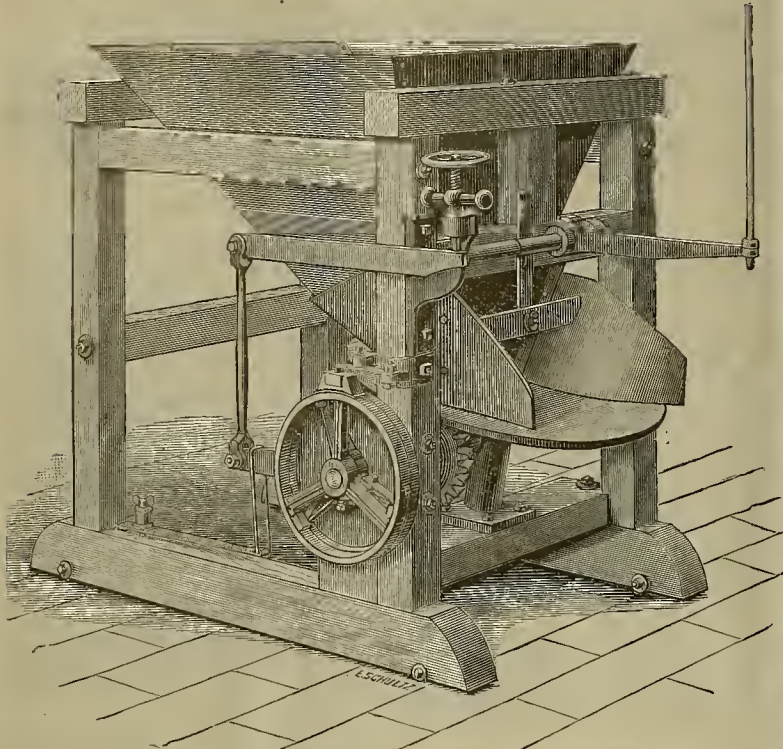
DISCOVERY OF PETROLEUM.—*Ellensburg Capital*, Aug. 16: It was reported yesterday that petroleum had been found in Winatchee valley, while prospecting for coal. The surface-water is covered with oil which readily ignites when a match is applied. With oil added to the other great resources of Kittitas county, there is nothing to prevent this from becoming the richest section of the Pacific Northwest in a very short time. With coal, iron, gold, silver and copper in abundance, now we have petroleum in addition.

OUR IRON ORE.—Mr. Cornthwait, manager of the Ellensburg Foundry & Engineering Co., informs the *Capital* that the machinery will be here in a few days ready to be placed in the new building. He thinks a test can be made of the ore from the Iron mountain mines, which can be shipped to Ellensburg in great abundance, as the mines are near the Northern Pacific railroad and of easy access.

RICH GOLD AND SILVER STRIKE.—Last spring, Mr. McDonald, while prospecting along the Similkameen, discovered some very promising float, which he traced to the ledge and located the Southside mine. The ledge was found to be very large and promising, and several locations were made on it beside the Southside. Little work was done on it, however, till last week, when a blast was put in, throwing out rock that assayed \$512 silver and \$20 gold, and exposed a fine body of ore. The owners of the Southside are delighted with their find, and will prosecute work on it quite extensively. They think they have one of the biggest and best mines in the country, and will demonstrate it in a short time,

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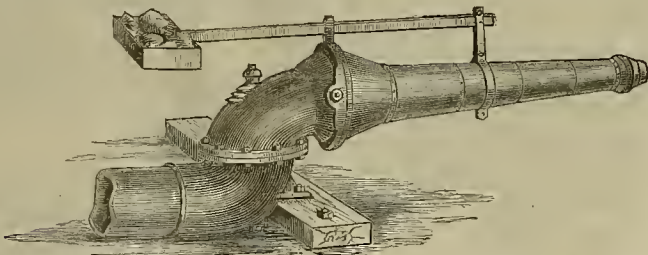
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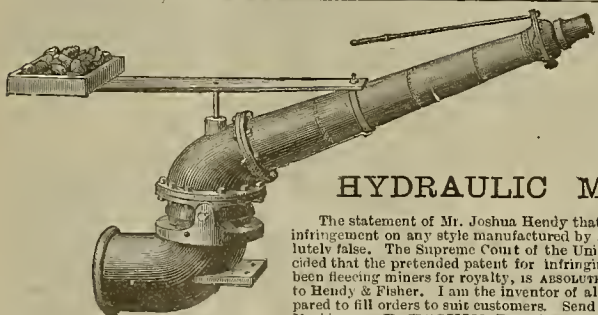
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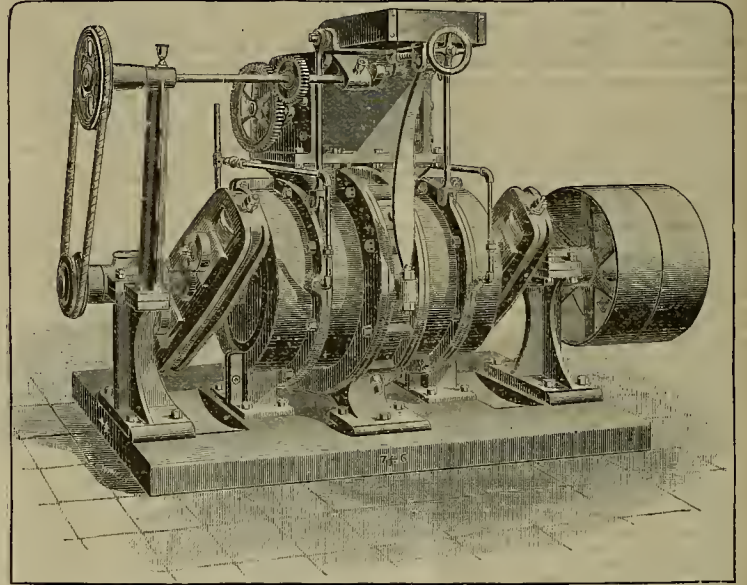
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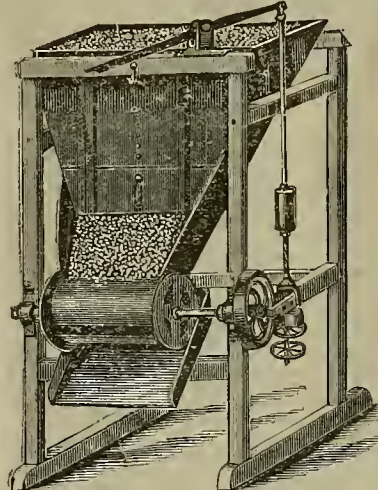
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BAN SILVER—9½¢ per oz.
BORAX—0c.
COPPER—LAKE—\$16.75.
IRON—No. 1, \$22.00.
LEAD—\$4.32½@—
TIN—\$21.00@—

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Steady, spot closing at \$16.70@16.80. Transferable Notices (Lake) issued at \$16.50@—, LEAD—Firm, at \$4.30@4.40 spot. Transferable Notices issued at \$4.00@4.15.
TIN—Irrregular, at \$20.10@21.00.

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Canton Tin, @—@ Baltimore Copper, \$1.75@15.00.
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Foreign Lead, \$4.60@4.7; Foreign Spelter, \$5.40@5.50. Antimony, \$9.75@13.50.

News in Brief.

The great reservoir at Sweetwater, San Diego county, is to be stocked with 10,000 young trout.

A few years ago San Luis Obispo county was awarming with sheep. Now there are but 1500 in the county.

It is rumored in Vienna that the Russian Government has contracted for a loan of \$3,000,000 in America.

SETH GREEN, N. Y. State Superintendent of Fisheries, and famous as a fish culturist, died on Monday last.

There will be an international horse show in Paris next year, where \$45,000 will be distributed in prizes.

The Japanese Government has decided to spend \$10,000,000 in five years for the purpose of purchasing men-of-war.

CONGRESSMAN SPRINGER says that in two weeks after the passage of the bill opening Oklahoma Territory 100,000 people will have settled in it.

The cannery on Puget Sound say they will not pay 17 cents each for fish, and a lively time is expected with the fishermen, who have fixed their price at 17 cents.

PHYSICIANS in charge of the hospital at Jacksonville, Fla., declare that all the deaths so far have been due entirely to the intemperate habits of the patients.

THE native pupils of the Industrial school at Sitka have an organized military company and are receiving instructions from Lieut. James A. Turner of the United States Naval Guard.

DR. PASTEUR at Paris read before the Academy of Sciences a letter from Dr. Gamaleia of Odessa announcing the discovery of cholera vaccine. The announcement was favorably received.

It is proposed in England to provide judges at race-tracks with an instantaneous photographing apparatus by which to tell beyond possibility of mistake what horse has won in a close finish.

THE late A. J. Palmer of San Diego was buried in the ocean on Saturday, in accordance with his directions. His remains were placed in a box, taken beyond Point Loma and sunk with heavy weights.

At Jacksonville, Fla., 500 negroes visited the city in hopes of receiving a share of the Relief Fund from the Government, and were amazed when told that they could draw nothing unless injured by the yellow fever.

BEFORE the Congressional Committee of Immigration William Blake, superintendent of Charities, testified that papers and idiots have been habitually sent to this country and that 70 per cent of the inmates of our almshouses are foreign.

THE old Santa Inez mission, which has stood the weather for a long term of years, will undergo repairs. The tile roof is to be carefully taken off, and all the old timbers removed and new ones put in their stead. The tilings will then be replaced as they were originally.

GEORGE GORDON of Big Valley, Shasta county, was driving with his family toward Cottonwood, when his team was attacked by a swarm of yellow-jackets. The horses ran away, the family was thrown out and more or less bruised, and one of the horses was stung to death.

THE joint statement of the Senate and House Appropriations Committees up to August 15th shows the grand total of appropriations to be \$428,269,520 55, an excess over last year of \$64,054,730.81. Since the 15th the Fortifications bill has been reduced two and a half millions, and it is probable \$3,000,000 more will be taken from the Army bill. This would make the probable surplus for the next fiscal year something over seventeen and a half millions.

FOR some time a considerable amount of telegraphing has been going on between J. D. Spreckels & Bros., agents of the Oceanic steamship Co., and Postmaster General Dickinson, and they received a semi-official assurance from Washington that the Postoffice Department would allow the company all sea and inland postage on mail sent from the United States to the Australian Colonies for the coming year for maintaining the service. This will amount to about \$50,000 annually. The Colonial Governments wished the United States Government to contribute one-third of the subsidy, or about \$65,000 annually.

San Francisco Metal Market.

WHOLESALE.		THURSDAY, August 23, 1888.
ANTIMONY—French Star.....	9	@ 9 1/2
BORAX—Refined.....	—	@ 7
Powdered.....	7	@ 7
Concentrated.....	6 1/2	@ 6 1/2
COPPER—		
Bolt.....	28	@ —
Sheeting.....	28	@ —
Ingot.....	—	@ 26
Pick and Shovel.....	—	@ 26
IRON—Glenbrook ton.....	—	@ 28 50
Eglington ton.....	—	@ 27 00
American Bolt, No. 1, ton.....	—	@ 31 00
Orange Pig, ton.....	21	@ 23 00
Olay Lane White.....	—	@ 23 00
Shots, No. 1.....	—	@ 29 00
Bar Iron (base price) @ lb.....	21	@ —
LEAD—Pig.....	5 06	@ —
Bar.....	5 23	@ —
Sheet.....	8	@ —
Pipe.....	7	@ —
Shot, discount 10% on 500 bag Drop, @ bag.....	1 55	@ —
Buck, @ bag.....	1 75	@ —
Obtained, do.....	1 95	@ —
STEEL—English, lb.....	16	@ 20
Black Diamond tool.....	10	@ 16
Pick and Hammer.....	8	@ 10
Machinery.....	4	@ 5
Too Calk.....	4 1/2	@ —
TIN PLATE—Coke.....	5 75	@ 6 50
Charcoal.....	6 75	@ 7 25
QUINOLINER—By the Bale.....	83	@ 40 00
Flasks, new.....	1 05	@ —
Flasks, old.....	85	@ —

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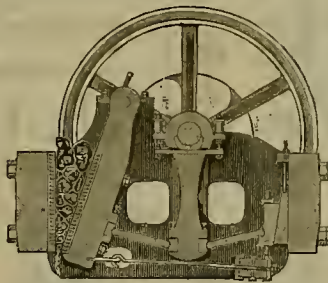
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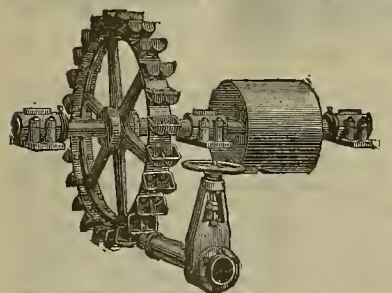


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Cast Steel Castings and Steel Forgings

UP TO 20,000 LBS. WEIGHT.

True to pattern and superior in strength, toughness and durability to Cast or Wrought Iron in any position or for any service.

GEARINGS, SHOES, DIES, CAMS, TAPPETS, PISTON-HEADS, RAILROAD and MACHINERY CASTINGS of Every Description.

—ALSO—

**HOMOGENEOUS STEEL, SOFT and DUCTILE,
SUPERIOR TO IRON FOR
LOCOMOTIVE AND MARINE FORGINGS.**

ALSO Steel Rods, from 1 to 3 inch diameter and Flats from 1 to 8 inch. Angles, Tees, Channels and other shape Steel Wagon, Buggy, and Truck Tires, Plow Steel, Machinery and Special Shape Steel to size and length. STEEL RAILS from 12 to 45 pounds per yard. ALSO, Railroad and Merchant Iron, Rolled Beams, Angle, Channel, and T iron, Bridge and Machine Bolts, Lag Screws, Nuts, Washers, Ship and Boat Spikes, Steamboat Shafts, Cranks, Pistons, Connecting Rods, etc. Car and Locomotive Axles and Frames, and Iron Forgings of all kinds, Iron and Steel Bridge and Roof Work a Specialty.

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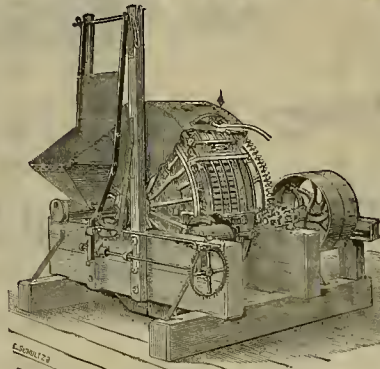
FULTON IRON WORKS,
HINCKLEY, SPIERS & HAYES, Proprietors.

(ESTABLISHED IN 1855.)

Office, 213 Fremont St.,

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—MANUFACTURERS OF—



TUSTIN'S PULVERIZER.

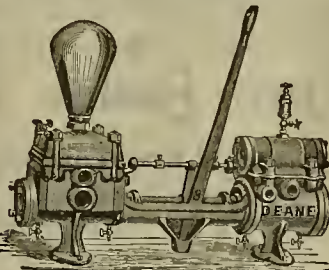
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WORKS ORE WET OR DRY.



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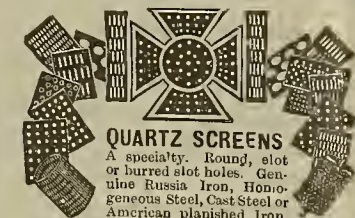
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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
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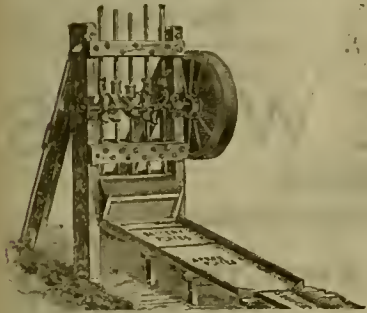
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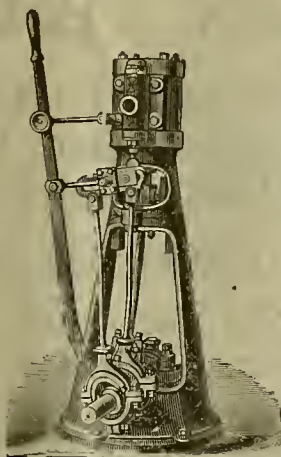
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By our NEW AND PATENTED SYSTEMS (by which the duty or performance of drills is not reduced with use) it is no longer necessary

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Since the reasons which formerly restrained us from the California market no longer exist, we are now in the field for two business.

SPECIAL ATTENTION is called to the latest designed sectional Compressor just built for the Batopilas mine in Mexico, and to the Compound Engine Compressor built for the Anaconda mine in Montana.

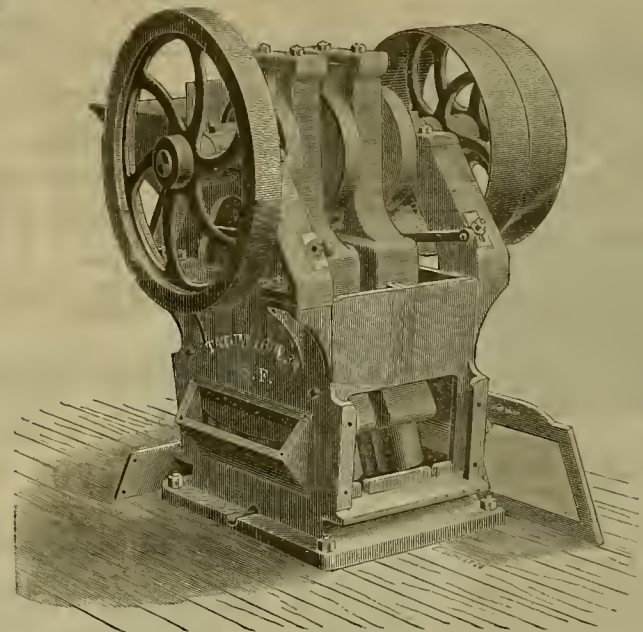
ROCK DRILLS
AIR COMPRESSORS &
GENERAL MACHINERY FOR
MINING, TUNNELING,
QUARRY & RAILROAD WORK
RAND DRILL CO 23 PARK PLACE NEW YORK

to buy a Compressor of double capacity than the drills are expected to require, in order to keep up the supply of air necessary on account of the wear of drills and compressor.

Besides having THE NEWEST AND LIGHTEST designed small drill plants, the Rand Drill Company, as is well known, has built, and is now building, the LARGEST COMPRESSOR

of cylinder.

THE DOUBLE "ECONOMIC" STAMP MILL.



We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the rapidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in any other mill to do the same amount of work.

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AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

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HOISTING ENGINES FOR MINES.

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

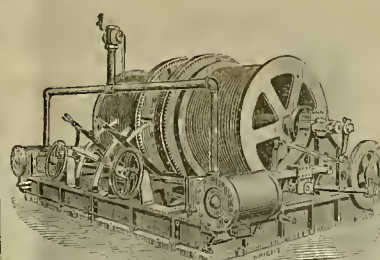
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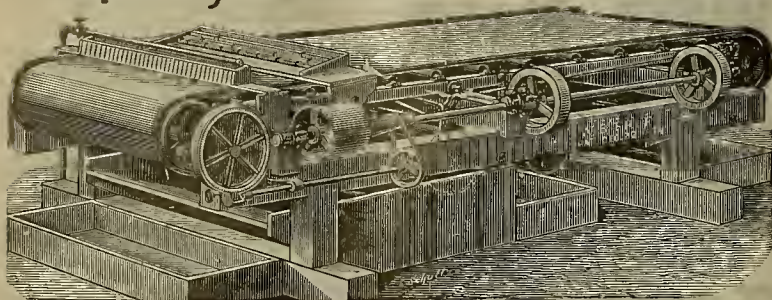
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**PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS
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THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

**ADAMS & CARTER, Agents Frue Vanning Machine Co.,
Room 7. No. 109 California Street, SAN FRANCISCO, CAL.**

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R. S. MOORE, Superintendent.

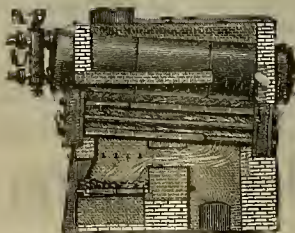
L. R. MEAD, Secretary.

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WATER TUBE
BOILER.**



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ECONOMY,
AND FACILITY OF INSPECTION AND REPAIRS.**
60,000 Horse Power now in use.

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STEAM ENGINES—Corliss, Slide-Valve, Poppet Valve Automatic, Single, and Compound.

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iron pulleys; will not break in transportation.

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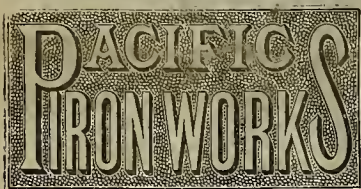
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Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

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A Saving in Fuel of at Least 20 per cent Guaranteed over any other form of Boiler.

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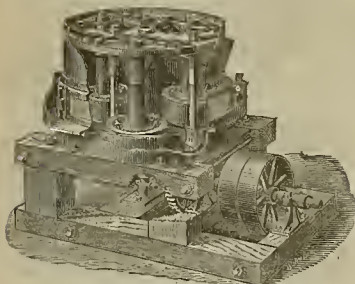
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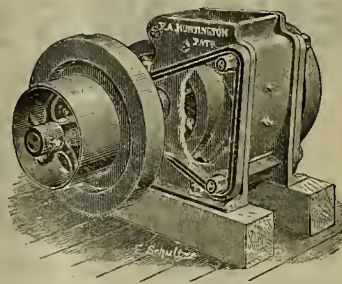
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CONCENTRATORS AND ORE CRUSHERS,
Mining Machinery of Every Description,
Steam Engines and Shingle Machines.**

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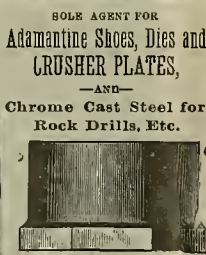
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ADAMANTINE SHOES AND DIES.—Guaranteed to prove better and cheaper than any others. Orders solicited, subject to above conditions.
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SAN FRANCISCO, SATURDAY, SEPTEMBER 1, 1888.

VOLUME LVI.
Number 9.

The "Kriebel" Stationary and Marine Engines.

In the Industrial Exposition of the Mechanics' Institute, now being held at the pavilion, we were pleased to note in the exhibit of machinery made by the Joshua Hendy Machine Works of No. 51 Fremont street, this city, a stationary and marine or boat engine denominated the "Kriebel." These engines, as will be observed by an examination of the cuts herewith presented, differ from those of the slide-valve pattern, inasmuch as the "Kriebel" have a moving or vibrating cylinder and stationary valve instead of a stationary cylinder and moving valve. By this arrangement of parts the eccentric valve-rod, cross head and connecting-rod found in slide-valve engines are dispensed with, the construction of the engine greatly simplified and the friction of movement reduced to a minimum. There are fewer working parts and are therefore durable and easily attended.

The framework of these engines is cast in one piece and is well proportioned in design and strongly built, thereby preventing the working parts from drawing out of line.

The cylinder trunnions and steel crank-shaft are held in position by strong boxes, lined with the best brass babbitt metal. The piston-rod is made of steel. The adjustable crank-box and mortised in and bolted to an iron body or box into which the end of the piston-rod is screwed and securely fastened by a steel pin. The cylinder is bored out perfectly true and the piston carefully fitted. The piston has three rings supported by springs and can be readily expanded. The cylinder is incased by a Russian iron jacket bound by brass bands, and the space between the cylinder and its jacket is filled with asbestos lagging.

The Kriebel marine or reversing engine possesses the advantages of compactness, light weight, great strength, slight friction, high speed and extreme simplicity. In addition to all of these, they are provided with an ingeniously contrived reversing device that is far more simple, acts more quickly and is much more easy to handle or manage than the link motion, adopted on other styles designed and intended for the performance of similar marine, boat or other service.

These engines are constructed upon the same principle and in the same manner as the stationary engine first above described, but in place of a governor they have a reversing arrangement. This consists of a cup-shaped valve

attached to a lever and inclosed by a casing. The steam pipe of the engine is screwed into the top of the casing and the exhaust pipe into the side. The movement of the reversing lever from side to side changes the course of the steam from the center-valve port to the two side-valve ports, and vice versa. This reverses the engine or causes the crank to move in the opposite direction. The reversing valve also answers the purpose of a throttle, as by moving

it an investigation of the merits of these marine or reversing engines will prove advantageous and pleasurable.

SOME time since it was learned that there existed in Mill Creek canyon, San Bernardino county, an excellent article of sandstone suitable for building purposes. Small parties at once located quarries, but none of them were pushed to a successful issue save one, which

Red Chief Gold Mine.

We had a conversation this week with a gentleman who is familiar with the Red Chief gold mine. This mine is on Kanska creek, which is four miles from Forest City and on the road from Nevada City to Forest City. This is a very large property having three veins, one of which is 80, one 25 and one about 50 feet in width. It is in length more than a full claim.

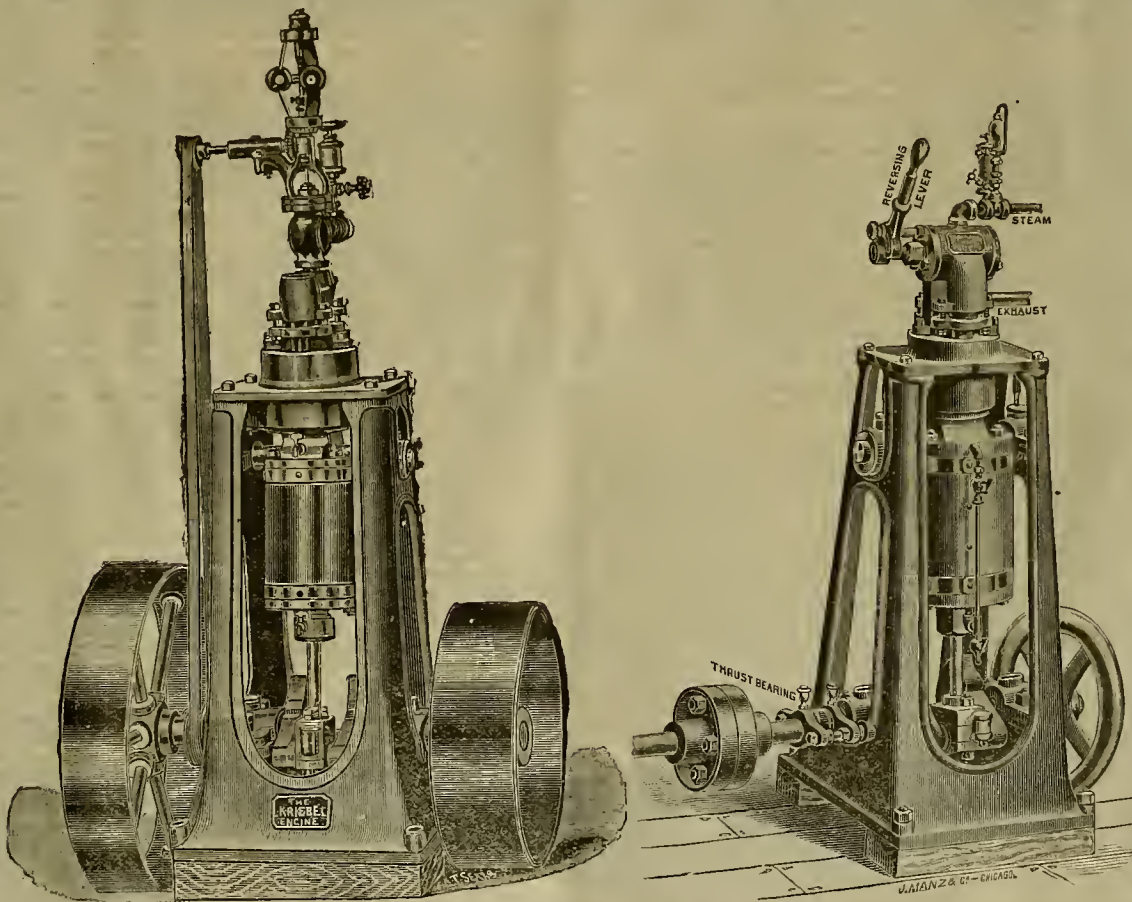
The company owning this property was organized in New York and came into possession of the mine about a year since. Sufficient money has been placed in the treasury to build the mill, purchase all the appliances and open the mine properly. There is plenty of timber near by, and the company claims the waters of Kanaka creek. A dam has been made in the river and a flume and road built. They have a sawmill in operation, and are now logging, bringing in the lumber and the timber for the mill.

They have the machinery for a 40-stamp mill all on the ground, and are putting it up with a full force of men. Until now there never had been a mill on the property. Several tunnels have been run and they are able to make a very large showing of ore.

The ore is free-milling, the sulphur and iron being decomposed. They expect to crush four tons to a stamp, the ore is easily worked; the batteries are all double discharge. Most of the gold in the ore is shot gold. The managing director is F. H. Hauman, whose

office is in the Safe Deposit building in this city; the superintendent is L. J. Lewis. The mill will run by water-power, a 23-inch Leffel turbine being used. It is expected that the mill will be entirely completed by the 1st of October.

WHEN the whites first went into that region all the Palmyra mountains, Como district, Nev., were covered with a splendid grove of nut-pine trees. It was the grand nut-pine orchard of the Pintes. The red children of the wild loved this grove of pines, and when the white men came into it with their axes old Capt. Truckee, with tears in his eyes, protested against its destruction. It was swept away, however, and even the tree stumps were dug up and hauled away. It is said that a sparse growth of young pines is now springing up all over these mountains. As the nut-pine is native to the soil and flourishes without artificial irrigation, this sort of growth should be encouraged in all parts of the country if the mountain-tops are ever to be covered with rain-attracting foliage.



"KRIEBEL" STATIONARY AND MARINE ENGINES.

the lever to a central position the steam and exhaust ports are closed and the engine stopped. These marine engines are also provided with an adjustable thrust or push bearing, which is so attached to the engine bed as to relieve the crank-shaft from all longitudinal strain.

By reason of the substantial, simple and perfect construction of either the stationary or marine form of these "Kriebel" engines, an inexperienced person can readily learn to operate them, and, for the same reason, an experienced engineer can run one with less attendance and expense than is required with engines of other styles. The only part that requires repacking, and that will seldom occur, being the brass stuffing-box for the piston-rod.

The simplicity of construction and economy of use and space, secured by the adoption of these engines, naturally suggests a critical examination of their operation at the Mechanics' Exposition, as they seem to us to be eminently adapted for use where small powers are required, and to those who are interested in boating and take pleasure in yachting, we be-

lieve an investigation of the merits of these marine or reversing engines will prove advantageous and pleasurable.

was under the management of Mr. H. C. Cahle. This gentleman at once put a large force of men at work getting out building stone, and then went to work getting contracts. He succeeded in getting orders for two buildings in Redlands and for several in Los Angeles. Up to the present time the work has been confined to getting out the Redlands rock. A joint-stock company has been formed, with a capital of \$50,000, to work this quarry, and it is their intention to put in a complete set of machinery and have the stone all dressed at the mine before delivery.

At present there are eight large lime-kilns perpetually burning in the Mojave valley, about 50 miles north of San Bernardino. Each has a capacity of 500 barrels of lime per day. The Oro Grande lime has supplanted Eastern lime, and is now sold in San Diego, Los Angeles, San Bernardino, Pasadena, Santa Ana and Escondido. Mr. Wyman has expended about \$40,000 in developing the lime business of Oro Grande.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

6. *Precipitation of the Silver from the First Wash-Water.*—Besides the method of precipitating by means of acid and old iron, the silver may be also precipitated from the first wash-water by means of sodium sulphide, or sometimes by dilution. The method by sodium sulphide is probably the better for Mexico of the first two, and is quicker, as the precipitation of the silver by iron requires about 12 hours, and heating of the wash-water in the precipitating-tanks. The average value of the various precipitates from different ores by the two methods would probably not differ much. But the method by acid and iron seems to be the most thorough, except when the wash-water contains such a very small amount of base metals, that (as at Yedras) all the base metals can be economically precipitated along with the silver. This very rarely happens. In most cases, when sodium sulphide is used, only enough is added to precipitate all the silver and part of the copper, without precipitating much of the remaining metals; but sometimes a small amount of silver remains unprecipitated. A point in favor of the method by acid and iron is, the extremely small bulk of the precipitate compared with that produced by sodium sulphide. This method consists in suspending old iron in the wash-water tanks and heating the water to about 175° F. (more or less), after acidifying it with 1 to 2 pounds of acid per ton of ore. The method of "dilution" consists in simply diluting the wash-water with sufficient pure water to precipitate the chloride of silver. It is not a safe method, however, for some ores, and it requires considerable water.

7. *Value of the Precipitates from the First Wash-Water.*—Table XVII gives the value of the precipitates, by both methods, from the wash-water of various roasted ores. The value of the precipitate of either method depends mostly upon the amount of copper present in the first wash-water, as it is practically impossible to avoid precipitating copper by either method. As a rule, the precipitate from ores with an alkaline wash-water is much the higher in value per ton.

b. *The Second Wash-Water and Mode of Using it.*—The volume of the second wash-water per ton for raw ores is always the same as the volume required to saturate the wet charges. It is used to restore the volume of the stock-solution, which would otherwise be diminished, for each charge treated, by an amount equal to the stock-solution remaining in the ore when the charge is drained. This amount is about 5½ cubic feet per ton of ore. For raw ores there are two methods of applying the second wash-water. In the first the ordinary solution is left standing level with the surface of the charge, the outlet of the leaching-tank being stopped. A measured number of inches of water, equal to the amount required to saturate the wet charge, is then run upon the charge. The outlet of the leaching-tank is then opened and the leaching continues until the water is at the surface of the charge. The water remaining in the charge is then allowed to run to waste, but not into the precipitating tanks for the leaching-solutions. By the second method employed, if water is scarce and must be economically used, the leaching-solution is allowed to drain out of the charge, and is then followed by water to the extent of about 5½ cubic feet per ton of ore, all of which is allowed to pass into the stock-solution. The volumes of second wash-water given in Table XIV for raw ores and tailings are those required when the first method is used. The average amount required for the six raw ores and tailings by the first method is 10.0 cubic feet per ton of ore. The use of the second method would reduce this to about 5½ cubic feet per ton.

The mode of using the second wash-water for roasted ores is the same as for raw ores, if the descending first wash-water was followed by solution at the time the surface of the first wash-water reached the surface of the ore. But if the first wash-water has been drained from the charge before the solution is used, then likewise the solution must be drained from the charge before the second wash-water is used. In this case the second wash-water is then applied by suddenly flooding the surface of the charge with about one-half inch of water, which descends through the charge and is allowed to pass into the stock-solution.

c. *The Total Volume of Water Required for both Raw and Roasted Ores.*—Table XIV gives the total volume of water required per ton of ore for both raw and roasted ores. For all the roasted ores, including Ontario, the average is 50 cubic feet. The average volume for all the raw ores and tailings is 10½ cubic feet, if the first, and 5½ if the second method is used.

E.—The Leaching-Solutions.

a. *Volume, Strength, Temperature, Preparation and Description of the Ordinary or Stock Solution, the Amount of Chemicals Required and the Rate of Decomposition.*—The advantages of keeping the volume of stock-solution as small as possible are, firstly, less heat to preserve a given temperature, if the solutions are to be used warm; secondly, less decomposition per day or per ton, and consequently less consumption of chemicals. The conditions upon which the volume of the stock-

solution depend are: first, the state of the ore, i. e., raw or roasted, raw ore usually requiring less solution than roasted ore; secondly, the capacity of the works per day, the volume of the stock-solution being less in proportion for works of 100 tons capacity than for those of 50 or 25 tons, as already shown; thirdly, the size of the charges, the volume of stock-solution being less in proportion for 50 ton than for 10-ton charges; fourthly, the regularity of the leaching, irregularity of using the solution necessitating a greater volume.

The strength of stock solution used at various works for roasted ores is as follows (expressed in percentages): Ontario, 1.4; Daly, 1.4; San Antonio, 0.8; Sombrerete, 1.0; Yedras, 1.8; Lake Valley, 0.8; Chloride, 1.1; San Bartolo, 0.7.

In starting works the stock solution is generally made up with 1.5 per cent of hyposulphite, the amount required for 3500 cubic feet being 3281 lbs.; for 2000 feet, 1875 lbs.; and for 1500 cubic feet, 1406 lbs.

The following statement gives the volume of the ordinary or stock solution used by the Russell process per ton of ore:

	Volumes of Stock Solution, Cubic Feet.
Silver Reef tailings.....	100
Bremont ".....	9
Veta Grande ".....	70
Silver Reef raw ore.....	137
Sierra Grande roasted ore.....	100
Yedras ".....	100
Ontario, 1887-88, ".....	196
Daly ".....	180
Veta Grande ".....	110
Ontario, 1883-84, ".....	190
Sombrerete ".....	90
San Antonio ".....	100
Chloride ".....	162
San Bartolo ".....	80
San Miguel ".....	70

The strength of these stock solutions in hyposulphite and the volumes of the first and last wash-water have already been given. The volumes and strengths of the extras are given elsewhere. This table, therefore, completes the description of the liquids used in the Russell process.

For simple alkaline ores, the solutions have all, so far, been used cold, and for raw ores and acid-roasted ores, at a temperature of 110° to 150° F. In the treatment of acid-roasted ores, even if the rest of the stock solution has been used cold, that portion immediately following the extra solution, and amounting to 18 to 24 cubic feet per ton, should be warm. In such cases, therefore, the use of an additional storage-tank for hot solution is necessary.

The ordinary or stock solution is made by dissolving a proper quantity of sodium hyposulphite in a measured volume of water in the storage-tanks. Generally the stock solution is made up of a strength of 1½ per cent hyposulphite (94 pounds for each 100 cubic feet of water).

After a little practice a stock solution of one-half the strength may often be used. The causes of the deterioration of the stock solution have already been given. In making up the extra solution, for each pound of bluestone used, one pound of hyposulphite of soda is temporarily destroyed, but is regained when the metals are precipitated by sodium sulphide. After the most advantageous concentration of the solution has been determined by experience, it should be maintained by constant addition of sodium hyposulphite, this addition being made to the extra solution for reasons already given. The strength of the solution in hyposulphite after it has been in use cannot be approximately estimated by its specific gravity for reasons that will soon become apparent. Hence a chemical test is the only one upon which reliance can be placed. The iodine method has already been given and it is the quickest and most reliable. Another method is to ascertain how much silver chloride will be dissolved by a certain number of cubic centimeters of the solution, but this is somewhat unreliable, except in experienced hands, as two hyposulphites of silver may be formed, one of which forms immediately, while the other forms only slowly and contains twice as much silver as the other.

The original stock solution gradually accumulates impurities, such as sodium chloride and sulphate and others, to slight extent, the source of which is evident. The first of these is perfectly harmless, the second diminishes the solvent energy of the solution to a very slight extent, the effect of which is simply to correspondingly increase (by 2 or 3 per cent) the volume of stock solution required per ton of ore. Calcium salts are introduced if gypsum is present in the raw ore, or if canstic lime or calcium sulphate exists in roasted ore. In case the lead is precipitated by soda, some of the calcium is also precipitated, as it would be difficult to discriminate between the two, even if the action of carbonate of soda on the one did not begin until the other had been entirely precipitated. The concentration of the solution in these salts, however, does not go on indefinitely, but

*For leaching works, as now constructed, the volume of stock solutions may be put as follows: For 100 tons' capacity, 3500 cubic feet; for 50 tons, 2000 cubic feet; for 25 tons, 1500 cubic feet.

†The small volume of solution used on the Bremen tailings is due largely to its strength (3 per cent) in hyposulphite. Owing to the extreme slowness of the leaching, a strong solution was used to shorten the time as much as possible. In nearly all the cases, except that just mentioned, less solution could probably have been used if it had been desirable to do so, but such a course would have made necessary a preliminary assay of the tailings before removal, which would have caused delay. In nearly all cases the tailings are removed before the assay of the tailings is known, a course which is nearly always allowable if leaching is systematically conducted.

reaches a maximum and then remains stationary, so that a new stock solution is never required, the same original stock solution being used year after year, although very little of the original chemicals may remain, on account of the losses and dilution, by the wash-water, which either precedes or follows or merely follows the stock solution. The amount of impurities in the stock solution at the Ontario, after two years' use, was such that the addition of harium chloride to 1.000 c. c. of the stock solution yielded a precipitate weighing 31.4 gr., after drying and 30.2 gr. after treating with HCl and igniting. The specific gravity of the solution was about 4° Beaume.

There is, however, a change in the condition of the stock solution that is of great importance, namely, in assuming a caustic reaction. Silver ores only that carry a comparatively large percentage of antimonial and arsenical compounds may be benefited by treatment with a caustic solution. Although the presence of caustic alkali, even in small quantities, is usually very injurious, the remedy is most simple and inexpensive, being accomplished either by the addition of sulphuric acid or bluestone to the stock solution. If the former is used the amount required will vary from one third to one pound per ton of ore, and the cost from one to four cents per ton. The effect of the extra solution in neutralizing caustic impurities has already been described.

One of the causes of the weakening of the stock solution is the decomposition of hyposulphite by taking up oxygen from the air. At the Ontario in '83-'84 leaching in the mill was twice interrupted, and the rate of decomposition of the mill stock solution determined. The strength of the solution was in each case 1½ to 2 per cent. In the first case the solution remained unused in the storage-tank for 26 days, during which it decomposed 5½ per cent. In the other case it remained unused 35 days, and the decomposition was 17.4 per cent. In this case, the depth of the solution was about 1½ times its diameter. The extent of surface exposed in proportion to the depth of the liquid has considerable influence on the rate of decomposition. For instance, the rate of decomposition in volumes whose diameter was seven times the depth was 1.8 times (for sodium hyposulphite) and 2.4 times (for calcium hyposulphite) the rate of decomposition for volumes whose depth and diameter were equal.

b. *Volume, strength, temperature and preparation of the extra solution, the amount of chemicals required, and the efficiency of the extra solution in the extraction of silver.*

1. *Volume and Depth of the Extra Solution.* The volume of the extra solution and its depth, in proportion to the depth of the ore, varies with the state of the ore, whether raw or roasted, and the method of leaching employed. The volume of the extra solution varies with the volume required to saturate a ton of ore. This, for raw ores or dry tailings, ranges from 6½ to 9 cubic feet per ton. For roasted ores, except the simple alkaline, the variation is 10 to 14 cubic feet per ton. For raw ores and tailings, if the extra solution is used on the dry ore, the volume of the extra is the same as the volume to saturate. For all roasted ores, except the simple alkaline, and for raw ores or tailings when the extra is not used first, the volume is six to ten per cent less than that of saturation, for a reason explained further on. For simple alkaline roasted ore, it is four to six times the volume required to saturate.

The relation of the depth of the extra solution to the depth of a wet charge, i. e., the depth after leaching has commenced, is as follows: For raw ores and raw tailings, the depth of the extra solution varies from 36 to 42 per cent of the depth of the charge of ore; for all roasted ores, except the simple alkaline, it varies from 34 to 46 per cent of the depth of ore; for simple alkaline roasted ore, it varies from 1½ to 3 times the depth of ore.

(To be Continued)

The Copper Market and the Syndicate.

James Lewis & Son's report on ores and metals (Liverpool) gives the following concerning the operations of the French copper syndicate:

The first six months of the operations of the Societe des Metaux and of the French syndicate to control the copper markets of the world, and enhance the value of this metal 100 per cent, having now passed, this seems a suitable time to criticise their effect so far, and endeavor to form some idea of how this gigantic speculation is likely ultimately to result.

The total production of the world was estimated by Messrs. H. R. Merton & Co. for the years 1885, 1886 and 1887 as 226,892, 217,070 and 224,490 tons; deducting from or adding to this the increase or decrease in the English and French stocks during each of these years, it would appear that the total consumption of copper in the world was 218,045, 208,394 and 244,886 tons respectively, or an average of 223,908 tons.

During the first half of this year it will be seen from the statistics that the imports into England and France have been 29,855 tons greater than during the same period last year, and as the production of copper in the Lake Superior district and in Montana will be much greater during the present half-year than during the past one (which included the winter months and stoppage of one-half the supply obtainable from the Calumet and Hecla mine in consequence of the fire) and the supplies from the smaller mines increased, we may reasonably

look for a similar, if not a greater, increase for the remaining six months of this year. Allowing for a similar increase of 30,000 tons, or 60,000 tons in all, the total production of the world this year promises to be 285,000 tons against 225,000 tons last year.

Our statistics show a decrease in the English and French consumption and English exports of copper during the first six months of this year of 10,000 tons. But as there is very little doubt that some 20,000 tons of copper smelted at the works of the Rio Tinto, Tharsis and Caps Companies in this country during this period are still on hand (6000 tons of English copper lying at Rio Tinto alone), in addition to the 65,000 tons of foreign copper in the public stocks, we consider that consumption has fallen off in the half-year to the extent of 30,000 tons.

As large quantities of old copper have been received since the 1st January, and this source of supply is now nearly exhausted, the decrease in the consumption of foreign copper this half-year may not fall below that of the corresponding period last year by more than 20,000 tons, although it was then exceptionally large, owing to smelters and manufacturers laying in large stocks during the great and rapid advance in values which took place the last three months of 1887.

This would give a total decrease in consumption this year of 50,000 tons, as compared with last, or say a total of 195,000 tons, against a total production of 285,000 tons, which would result in an increase in the stocks held on the 1st January last (35,000 tons) of 90,000 tons, making them 125,000 tons on the 31st December next.

Next year, unless some restriction is placed upon the output of the larger producers, we shall probably have a production of at least 300,000 tons, and even if consumption is as high as the average of the years 1885, 1886, and 1887—say 225,000 tons, there will be a further surplus of 75,000 tons, so that by the end of 1889 we may look for a stock of copper of 200,000 tons, and at the termination of the three years for which the contracts have been made by the Societe des Metaux, a stock of 275,000 tons against 35,000 tons on the 1st of January, 1888.

Chili has realized early in the month £81 5s. for cash warrants, but fell to £78 7s. 6d. on the 13th ult., the demand to cover prompts falling due having fallen off. With a revival of this demand the past week, up to £81 has again been paid, importers chiefly realizing the benefit of the advance, the syndicate having sold but little. The syndicate have continued buyers of three months prompt at £78, though in one instance £77 15s. was accepted for 50 tons from another buyer, while latterly, up to £78 10s. has been paid by other buyers. The market, however, closes much weaker, with sellers of cash at £80 10s. and of three months prompt at £77 10s.

For good merchantable copper there has been more demand of late, especially from the syndicate agents, and the price has advanced from £71 5s. to £73 15s. On the 20th ult. the English smelters fixed their price for best selected at £75, but sales were afterward made at 10s. to 20s. below this for some brands.

There has been an active demand for furnace material the past ten days, the syndicate agents having bought and offering to buy those lots not already under their control. This brought in smelters who have secured all they can, fearing that ere long they will be obliged to go to the syndicate and pay their price. For Anaconda matte, of which there are now 16 588 tons in stock here, 14s. per unit has been offered and refused, 14s. 6d. being asked.

The directors of the Quebrada Co. in their annual report state that the company's estimated production of copper has been sold to the Societe des Metaux for three years, from January 1, 1888. This company produced, during 1887, 2606 tons of fine copper, which realized an average price of £47 14s. 2d. per ton, or 9s. 6½d. per unit.

The price obtained by the Parrott Co. of Montana for their production is 13 cents per pound with half of any excess realized over this. They are permitted to produce 5000 tons (2000 pounds) this year, 5500 tons during 1889, and 6000 tons during 1890.

The Boston Montana Co. have, we understand, sold 45,000 tons for delivery over three years at 12 cents per pound, while the first contract for six months is made by the Anaconda Co. was at 11 cents, a contract for a further six months having subsequently been made, and a contract for a further period being now in course of negotiation.

One of the anomalies of the present situation is, that while those mine-owners who have contracted with the Societe des Metaux have only obtained from £53 to £65 per ton for their produce, the Chili producers obtain from £77 to £81 for their copper, the syndicate being obliged to buy all that offers in order to sustain the value of the 50,000 tons of Chili bars they already hold.

The Calumet and Hecla mine is being n-watered at the rate of about 5,000,000 gallons a day. It appears that at the present time the South Hecla, or Black hill's part of the mine, which is wholly separate from the main mine, is producing nearly as much copper as the whole mine was before the fire. The June product was 2542 tons of mineral, or 2033 tons fine copper, against 2395 tons fine during June, 1887.

The output of the seven principal Lake Superior mines for the first half of the following years has been: 1886, 18,153; 1887, 18,791; 1888, 18,931 tons (2000 pounds) fine.

The Sweetwater Dam in San Diego County.

Perhaps nothing in the progress of California is more interesting than enterprises for the storage and distribution of water. The importance of water supply in a land of dry summers needs no comment. What has been accomplished by bringing water upon arid soil involves the whole history of some of our most prosperous producing regions.

Though we have done creditable things for so young a State in water engineering, it is doubtless true that we are only beginning our great work in this direction. Probably those now living will see dozens of storage reservoirs ensconced in mountain canyons, the waters held in store by dams greater than anything yet attempted, and distributed over an area of great magnitude. Certainly the tide of affairs is setting strongly in that way; the Government work to that end, and the general disposition to combine effort and capital in local irrigation enterprises indicate that the future of irrigation in this State will be full of great things.

This week we give views from photographs of a notable water enterprise in the extreme south. The work was only finished last spring, and it has proved a notable success. It is one of the latest outcroppings of enterprise and confidence which were well placed years ago when the Kimball brothers planted themselves on the east shore of San Diego bay to grow up with the country. They were not, however, content to sit idly waiting until the country should grow and carry them along with it; they placed themselves beneath the country, so to speak, and made it grow by forces of honest and untiring pushing. Mrs. Flora M. Kimball, prepares for us a little sketch of the water enterprise of which our engravings give the most striking features.

The organization of the San Diego Land and Town Company, with 40,000 acres of land on and near National Ranch, was an important factor in attracting emigration. Col. William G. Dickinson of Topeka, Kansas, the famous town-builder for the Atchison, Topeka & Santa Fe R. R. Co., was chosen general manager of this company. Accepting the trust, he brought his family to National City, built a beautiful home, and with characteristic energy commenced his work, as he says the crowning glory of his town-building. So much having been accomplished without a system of irrigation, Col. Dickinson and his associates wisely decided that with an abundance of cheap water for irrigating and domestic purposes, both town and country would grow and prosper as they never had done before, and as it was impossible for them to do with the existing methods of water supply. The great Sweetwater dam was the outcome of this thought, the completion of which was celebrated April 19th of the present year. It was a proud day not only for National City but for the whole county, whose thousands of citizens met to offer congratulations for the success of the enterprise and to hear from the lips of those who projected and carried out the work how it had been so easily accomplished. Farmers and townspeople alike rejoiced. Troublesome old windmills were to be banished with other primitive methods adopted by agriculturists, and the unsightly water-barrel at the back door of the pretentious city home was to be among the things of the past.

The building of the dam occupied 17 months, and stands as a monument to the skill of J. D. Schuyler, chief engineer, to whom the public is indebted for his untiring faithfulness in the ex-



GENERAL VIEW OF THE SWEETWATER DAM AND RESERVOIR. SAN DIEGO COUNTY, CAL.

ecution of the great work. The dam is 46 feet in thickness at the base, 12 feet in thickness at the top, 75 feet in length at the base, and 396 feet in length at the top. It is 90 feet in height, and contains 21,209 cubic yards of masonry, in the construction of which was used 18,000 barrels of Portland cement. The reservoir is three miles in length and three-fourths of a mile wide. It covers 700 acres, and has a capacity of 6,000,000,000 gallons of water—a quantity sufficient for 500,000 people, or to cover 20,000 acres 12 inches in depth. Sixty-eight miles of wrought-iron pipe has been laid. The area of watershed is estimated to be about 150 square miles. There is not a structure of masonry on the American continent equal to the Sweetwater dam, and but four in the Old World of greater height. One of the most satisfactory features of the enterprise is, every dollar of its cost was paid as soon as completed.

The Sirieix Compensated Compass.

[From the *Journal de la Marine*, Paris.]

The naval commission of the Society of the Study of Colonial and Maritime Affairs has been called to meet with a view of examining a new system of compensating compass, invented by Mr. Leon Sirieix, an ex-pupil of the Polytechnic school, residing in San Francisco for the last 20 years.

After being introduced by Mr. L. Muller, the secretary of the commission, Mr. E. P. Voisard, a director and the general agent of the Sirieix Compass Co., placed his model of the compass over a wrought-iron structure measuring one meter in length, 30 centimeters in

width, 20 centimeters in depth, and representing the hull of a ship; then he proceeded with experiments.

To begin with, and in order to impart a larger inductive force, he placed a strong steel magnet to both ends of said iron hull. That force was such as to cause the needle of the compass to deviate as much as 160°, when the model was made to wheel around one-half revolution on its vertical axis.

After ascertaining the error, the regulator was set in its place under the compass card, and in one instant the deviation was completely annihilated. The experiment was repeated several times at the wish of those present. Among the latter were Admiral Thomasset, the president of the society; Mr. Bouquet de la Grye, the chief hydrographic engineer; Mr. Lisbonne, director of naval constructions on the retired list; Barnum Michel, an ex-officer of the navy; also several engineers, insurance companies' officers, etc.

The model used by Mr. Voisard included a bowl with an open section intended to allow those present to examine the disposition and working of the regulator and of the soft iron blocks.

The Sirieix compass is composed of a cylindrical bowl, measuring in height about twice its diameter, and is divided into two parts; the upper one carrying the compass card, and the lower one carrying the magnetic regulator for the correction of the sub-permanent magnetism; also the soft iron inductors intended to correct the action of induced magnetism.

The compass card may be made of mica, paste-board or paper; that in the model was carrying

three magnetic bars, *c, d, e*, as shown in Fig. 1. Nothing would prevent adopting a compass card with shorter needles, attached under the card, such as are those introduced for the compass destined for torpedo boats.

The regulator is composed of two disks set parallel to each other, and between them, in the center, there is one or more magnetic bars, placed one above another—according to the quantity of magnetic force that is to be corrected—and on each side of the center bar at 30° distance from the latter, a small bar very thin.

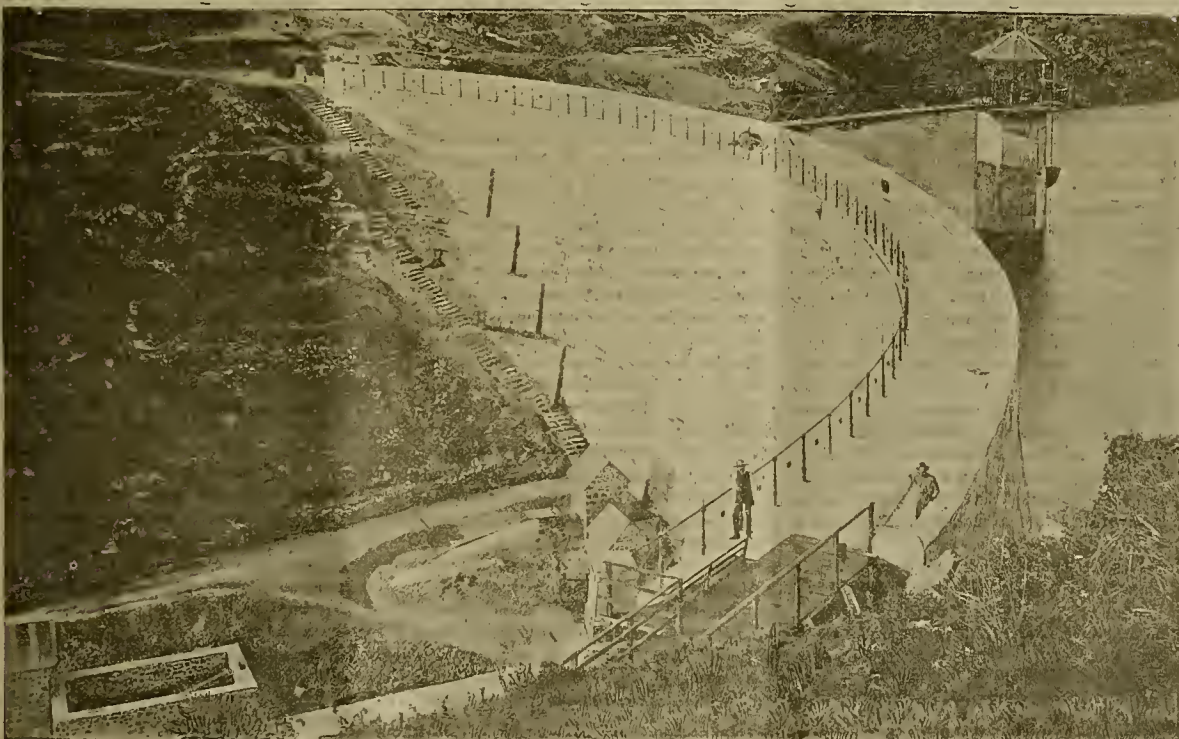
These disks may be made of glass, paste-board, brass, aluminum or any other non-magnetic substance. Those of the experimental compass were made of brass; some others belonging to smaller compasses are made of silver (German silver).

On the surface of the upper disk are found four pairs of magnetic bars of very thin size placed diagonally to each other, and disposed in such a manner that their poles alternate around the circumference so as to balance their magnetic action. At the bottom of the lower bowl there is a brass bar, carrying two small blocks of soft iron. By means of a set screw those blocks can be moved to a certain angle so as to compensate the quadrantal error resulting from the ship's soft iron. Two small vertical pins maintain the regulator in a steady position when it is raised or lowered by means of the regulating screw. Another brass bar carries two strips of soft iron intended for completing compensation, when necessary. The cap on which the regulator is fixed can be raised or lowered so as to render regulating more or less sensitive by means of a spindle traversing the bottom of the bowl.

The theory of this compensated compass, therefore, consists in generating with small magnetic bars and soft iron blocks, an equal and inverted action to that which causes the deviation of the compass card, and this result is obtained by neutralizing the force of the sub-permanent magnetism and that of the induced magnetism of the ship, whether it may derive it from its construction, its cargo or equipment. In other words, the disturbing influence is neutralized by a correcting influence that will act with an inverted polarity and will bring the needle of its compass card into the differential of those two forces.

Thomson's compass is known to require the use of a binnacle of from 70 to 80 centimeters in height, in which are placed the many compensating magnetic bars, and also masses of soft iron. In the Sirieix compass, on the contrary, all the compensation is produced with the same elements reduced to their most simple expression, at the same time generating around the magnetic needle a double magnetic action which neutralizes the influence from the ship's iron. As can be seen by this short description, the compensation of this compass is obtained in a very simple manner without the adjunction of compensating masses of iron outside of the instrument, such as the large balls of the Thomson compass, and also without any systems for regulating, which are always delicate and require being very frequently adjusted.

The compass of Mr. Leon Sirieix has also the advantage of returning very promptly to its position of rest. Mr. Voisard has not hesitated coming from San Francisco to Paris, as he had it at heart to secure the approbation of his countrymen. We will recall the fact that this compass has been carefully examined in the United States by special professors, and by a commission appointed for the purpose by the navy department. It has been very favorably reported on, and the instrument has already obtained a great notoriety.



THE SWEETWATER DAM, SHOWING PLAN OF CONSTRUCTION.



A. T. DEWEY.

W. B. EWER.

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W. B. EWER..... SENIOR EDITOR

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A. T. DEWEY.

W. B. EWER.

G. H. STRONG.

SAN FRANCISCO

Saturday Morning, Sept. 1, 1888.

TABLE OF CONTENTS.

EDITORIALS.—The Kriebel Stationary and Marine Engines; Red Chief Gold Mine, 137. Passing Events; A Commission to Investigate the Debris Question; Making Provision for the Oncoming Generation; Trinity County Mines, 140. Accidents to Miners; The Golden Gate Concentrator, 141.

ILLUSTRATIONS.—"Kriebel" Marine and Stationary Engines, 137. The Golden Gate Concentrator, 141.

MISCELLANEOUS.—The Russell Process; The Copper Market and the Syndicate, 138. The Sweetwater Dam in San Diego County; The Sirieux Compensated Compass, 139.

SCIENTIFIC PROGRESS.—Science and Vegetation; Mineral Aggregations in Vegetable Growth; How Sumatra Fishermen Test the Depth of the Sea; Curiosities of Magnetism; Shadows on the Wall Reduced to a Fine Art; Immensity in the Size and Distance of the Stars; The Influence of Temperature upon the Value of Bleaching Powder; How a New Tanning Agent is Gotten, 142.

MECHANICAL PROGRESS.—A New Principle in Steam Packing; Behavior of Steel During Hardening; Crystallization by Repeated Heatings; Weight of Locomotives; Tinning by Simple Immersion; Compressed Paper for Axle Bearings; Tempered Brass; Read Your Mechanical Journals; A New Material for Telegraph Poles; American Pumps in London; The Inventive Yankee Outdone, 142.

USEFUL INFORMATION.—A Substitute for Gum Arabic; Increasing the Eggs; Colored Leather; The Effects of an Explosion of an Ammonia-Tank; To Expel Mosquitoes from a Sleeping Room; To Distinguish Fresh Eggs; A Little Knowledge a Dangerous Thing; A Beautiful Bird; Glass for Polishing Powder, 143.

GOOD HEALTH.—The Use of Water at and Before Meals; Cold Water as a Stimulant; Can a Fly Import Rabies; A New Use for Tobacco; The Fruit Cure; Hot Water with Lemon Juice; New Theory as to the Treatment of Frost Bites, 143.

ENGINEERING NOTES.—Great Progress in the Science of Tunneling Under Rivers; The New York and New Jersey Tunnel; Connecting the Atlantic and Mediterranean, 143.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 144-45.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board. Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 145.

Business Announcements.

[NEW THIS ISSUE.]

Mines Wanted—F. H. Hausman.

See Advertising Columns.

Passing Events.

It is not to be expected that we can always include in our category of "Passing Events" much that is startling or even altogether new to the readers of the PRESS. Occurrences that would arrest general attention, and perhaps excite deep interest in communities where mining is pursued in a small way, pass by here unnoticed or elicit but a casual remark. What in most other countries would create a tempest produces here but a ripple on the surface of the deep-flowing current of mining events. The great industry moves on little influenced by the accidental happenings that mark its career, the outcome as a whole being so satisfactory and grand.

Since our last issue Central Nevada has been visited by a rainstorm of such phenomenal violence, that but for its long continuance and the area it covered, might have been mistaken for a regular "cloud-hurst."

There prevails a water dearth in some parts of the mining regions, its effects being most felt in the quartz districts of California and in the vicinity of the Comstock lode, where many

stamps have been hung up in the mills, dependent on water for their motive-power.

The State Mining Bureau is just now the scene of much activity, not to say of downright hard work.

The copper miners, encouraged by the high prices ruling for that metal, are everywhere exerting themselves to make as large a production as possible—making hay while the sun shines.

Forest fires with much excessively hot weather have of late prevailed in the interior. Apropos to this condition of things, a Presidential canvass being in progress, the political dog-star reigneth. What makes it pleasant for both parties to the contest is that each is entirely confident of success. Our motto is: "May both win."

A Commission to Investigate the Debris Question.

Early in its present session a bill was introduced in Congress relative to the business of hydraulic mining in California. By the provisions of this bill the General Government is required to appoint a commission of engineers to ascertain and report to what extent, if at all, hydraulic mining can be carried on in the enjoined districts without causing additional injury to the farming lands or further obstructing the navigable waters of the State. This commission is to consist of Government engineers and to be paid out of the public treasury. This bill in the Senate having been referred to the Committee on Mines and Mining, that body, through its chairman, Wm. M. Stewart of Nevada, has reported it back favorably, recommending its passage.

In its report this committee recites the fact that the Legislature of California, at its last session, requested Congress to enact a law of this kind, a resolution having been adopted by both the Senate and the Assembly to that effect; also that many and numerous signed petitions from this State have been sent to Congress asking that measures be adopted for relieving the miners from the hardships of which they complain, if this can be done without detriment to other important industries and interests.

This done, the history of hydraulic mining in California is briefly recounted, its growth from small beginnings into a great industry, the costly improvements made for its furtherance and its large and profitable output of gold being succinctly set forth. Epitomizing the subject, the topography of the mining region, the plan of operating by this process, and its effects upon the outletting streams are described. The injury arising to the public through the shutting down of these mines and the financial ruin in which it has involved the owners are forcibly presented; the committee reminding Congress that this class of miners when they bought their lands from the General Government, paying an extra price for them, did so with the implied understanding that they should be allowed to work them by the hydraulic method, it being impossible to work them by any other.

In consideration of the premises the committee recommend that the General Government appoint a commission of its own engineers to visit the mining districts and by actual inspection ascertain the cases in which it would be practicable for the miners to so impound their tailings that they would cause no further serious harm to the agricultural lands nor yet much increase existing impediments to navigation, the committee expressing the opinion that such commission would, on a careful examination, find some, and perhaps many, cases of this kind; their report concluding with the remark that, "The United States having undertaken to enjoin the working of these mines through the Federal courts, your committee deem it reasonable that a thorough investigation should be made by the United States, to the end that no more mining property shall be destroyed by Federal injunctions than is necessary for the preservation of the rivers and the protection of the farming lands in the valleys."

In this report the well-known familiarity of Senator Stewart with everything that relates to mines and mining is amply apparent, and while the paper is moderate and even conservative in tone, it discloses a desire that hydraulic mining may be permitted to go on wherever this can be done without material prejudice to other interests.

As the General Government is to defray the expenses of this commission, there can be no

good cause for objecting to its appointment. Heretofore most of the testimony taken in the investigation of this question has been *ex parte* and, therefore, more or less biased, or open to the suspicion of being so. Even the professional work done has partaken largely of this character, the parties complainant and defendant appearing each with their own set of experts, viewers, and specialists. Not only so, but the contestants themselves have been permitted to take the stand and testify in their own behalf.

Under these circumstances, the testimony of witnesses would naturally be tinged, if not violently warped, by self-interest or prejudice. Presumably all have been more or less prepossessed one way or the other. What is now required is information derived from a competent and, at the same time, wholly disinterested source, such as that to be obtained through the proposed commission would undoubtedly be. Trained engineers, selected with reference to their fitness for such service, exempt from all local influences and wholly impartial, their findings, whatever they might be, would command the confidence of all and give general satisfaction. Even the miners would be likely to accept them as final. If nothing can be done for the relief of this class, as perhaps there cannot be, it were well they should know this as soon as possible, to the end that they adopt some other method for working their gravel deposits so far as practicable, and, giving up the legal warfare in which they have so long been engaged, conform their action to the inevitable. It is to the interest of all—the farmer, the miner and the general public—that this much-vexed question be set at rest.

Trinity County Mines.

Reports come to us indicating much activity and confidence in the mining future of Trinity county. Few districts of the State appear to be coming more encouragingly to the front. The new discoveries are numerous, and some of them, it is confidently expected, will soon take rank among the leading mines of the State. The town of North Fork is particularly lively just at this time, says the *Trinity Journal*. The mines owned by John Day, which are now being developed, are evidently on a good paying basis. An arastra is kept running night and day on what, we presume, is picked rock, as it is reported to pay \$125 to the ton. The Thanksgiving mine, owned by Bargin & Co., is turning out good ore. The Enterprise Company is building an ore-hin that will hold 3000 tons of rock. There are a large number of promising mines being developed in this vicinity, and a mill will soon be erected there. The Davis Brothers, John Day, James Haley, and others, are meeting with great encouragement. The mines owned and controlled by Capt. Trueworthy, known as the Orland, Fountain Head, Grizzly, Bell and other mines, are looking well. He has a force of men at work on each of the above-mentioned mines, and the more work is done the better the ledges develop. The ledges promise from \$20 per ton up to very high figures.

The captain was in this city a few days ago and left with plenty of money to carry on his work of development. He has spent the last two or three years in prospecting along the north, east and south forks of the Trinity, a scope of country of over 100 miles. Captain Trueworthy's character has so long been proverbial among old-time business circles of the State for frankness and integrity that we put great faith in the information gathered from him. The "honest captain" has faithfully explored the region of which he speaks, and his opinion is that the mineral prospects and mines of Trinity are just entering upon a long term of signally profitable working. The quartz veins are, for the most part, of ample width, and wood and water are more than usually abundant. New roads and other improvements are being made in localities heretofore reached only by rough trails.

Much placer ground is also being worked with large profit. The mines yield free gold very generally and the sulphurets are in richness all that a reasonable miner could ask. Some of the most conservative and wealthy business men of the city are investing in these mines. The town of North Fork is distant 17 miles by stage from Weaverville, the county seat. East Fork is about five miles to the northward. New River (North) is 35 miles distant.

Making Provision for the Oncoming Generation.

More than once has this journal taken occasion to say something about the importance of early training the youth of California to habits of industry and the advantage of providing labor-schools as auxiliaries to that end. But, all this accomplished, little will it avail unless there shall at the same time be provided ample and suitable labor for these young people to perform. Simultaneously with this preparation of the children for work, the work itself must be furnished to their hands. The land and the mines present in this country broad fields for the employment of labor, open to all. But this labor is of a kind that cannot be made universally available. It needs to be supplemented by other forms of industry. And it is in these that California is deficient. We require a system of more diversified pursuits, to the end that every kind and class of laborers may be furnished with employment. Not always can the boys, the girls, or the women leave the cities and towns and go out on the land or into the mines to work.

We have in this State 50,000 youths who should be earning their own livelihood or contributing something toward that end, but who are doing little or nothing, because there has not been supplied suitable work for them to do. Now, whether such labor shall be supplied or not, one thing is certain—these young people are bound to get a living somehow or another. There is no mistake about that; and if in the future we shall find ourselves with a disagreeably large number of these idlers on our hands it may puzzle us not a little to know what to do with them. We need not hope to get rid of them through recourse to emigration. They will not emigrate. They are here to stay; we may count upon that. They are attached to California, and, like some other of her indigenous growths, would not probably well hear transplanting. Persons born or long resident here are not apt to thrive or meet with contentment elsewhere. And as we cannot have riddance of them through emigration, so will it be found impracticable to lasso, and after 24 hours' impounding, dispose of them as we do the tagless dogs. It will really be best for us to utilize them as well as we can; and in the possibility that this youthful population will be neglected and suffered to grow up in idleness and vice lurks one of our direst perils, for it is the young that in every community constitute the element of greatest danger. Hence the importance of looking after them betimes and so providing for them that they may be self-supporting instead of becoming leeches and depredators on society.

Something might, of course, be said about extending our care to this class on the score of duty and humanity. But this is a commercial age—the trading instinct predominates; wherefore it is as well to discuss this question in the light of its economic value alone. We must be able to show the average tax-payer that there is money in the proposition, if we would interest him in the temporal salvation of this or any other class. And certainly the course we are recommending has the true business ring, since it establishes that it is cheaper to prevent pauperism and crime than to provide for the one and punish the other—shows that it costs more to convict and hang a boy than to bring him up rightly, the same being true of a girl.

Between natural increase and immigration, California is destined to a rapid growth of population. We produce the raw material for many kinds of manufactures cheaply and abundantly. Possessing in these the principal elements requisite for building up a system of diversified industries, we should address ourselves to that business at once and so push it that we will, in the course of a few years, be able to make things varied in kind and infinite in quantity—things necessary and unnecessary, useful and otherwise. Whatever is required to minister to the wants, desires and comforts, and even to the vanities and follies of mankind, that should we be preparing to supply—producing a thousand things that we need and twice as many that we don't need.

True, besides working the land and the mines, felling forests, building ships, forging iron, etc., we ought to be getting ready to make French dolls, German toys, jumping-jacks and flingdangs of every kind, because if these things are not made at home they will be purchased

abroad, and so money be sent away that ought to be kept in the country.

In looking over the list of our imports, one is astonished at the large number of articles it contains and the amount of money they annually cost us, the most of these being articles, too, for the growth or manufacture of which we enjoy here in California special advantages. Some of them are, in fact, composed of materials produced here, and which, after being carried away 20,000 miles and made up into various forms, are brought back and sold to us with cost of freight, handling, insurance, storage, manufacturing, and in some cases foreign duties, added. Thus we export wool, hides and tallow, portions of which come back to us made up into clothing, hats, boots and shoes, harness, soap, candles, etc. Enormous quantities of hog-stuffa, butter, eggs and cheese, and even canned fruits of certain kinds, are every year shipped to California from the East or other countries and here sold at a profit.

We cannot say exactly how many thousand bushels of choice fruits are annually suffered to rot under the trees in California, but they amount to a good many.

It looks like there were in all this a lack of thrift; and, in fact, there is. We not only neglect our opportunities, but we waste our substances at a most impoverishing rate. What is required is that we should make more, save more, and lay less, patterning in this respect after New England and Old England, who make about all they want and much to spare.

There being work enough here to be done, there will be good times for all if only it can be so arranged that labor and capital shall each do its part toward insuring effective and harmonious co-operation. Our resources are ample. It only needs that they be actively developed through the judicious and skillful application of these prime factors of production to secure to California a great and lasting prosperity.

Opportunities having been created and work provided for the oncoming generation, it is to be hoped that they will take to it kindly, especially where the conditions are so generally good and the rewards so ample as here in California. The youth of this State should bear in mind that their lot has been cast in a highly favored land, their burdens being light compared with those that have to be borne by the laboring classes in most other countries. Owing to our mild and healthful climate, much of our out-door work would be considered almost a pastime by the inhabitants of the Northern States and Canada, while the toiling, hunger-pinched millions of Europe would feel richly rewarded were they to receive half the wages paid the well-fed laborers of California. These are considerations that should not only reconcile the wage-earner of this State to his lot but fill him with a great contentment, and a determination to turn these many advantages to good account.

Accidents to Miners.

Francis Cook was killed August 12th while at work on a glance-crib on the railroad in British Columbia, being struck by a tree that was passing down the crib. Deceased, who was about 22 years of age, came from Bell Creek, Prince Edward Island, where his father resides.

August 19th, John McCormick and Con McCarthy were hurt, the latter very seriously, while drilling on a drift in the Elkhorn mine, Montana. McCormick, who was handling the drill, had his left eye entirely destroyed and quartz blown into the other, which will doubtless render it practically useless, if it is not totally destroyed. Besides this, he had large holes blown in his neck, and the front of his face and neck were lacerated to a great extent by the flying quartz. McCarthy fared better. He, too, was knocked down, but soon recovered himself, walked out of the drift and gave the alarm, and both men were soon brought to the surface. McCarthy's face and eyes were filled with flying quartz, though to less extent than McCormick's, and it is now believed that both his eyes will be saved. McCormick now lies in a critical condition, and, should he recover, it is more than probable that he will be totally blind.

John Kennedy, a short time since, fell down the shaft of the Queen Bee mine at Mineral Park, Arizona. The shaft is about 40 feet deep, but Kennedy reached the bottom without breaking any bones or receiving other serious injuries.

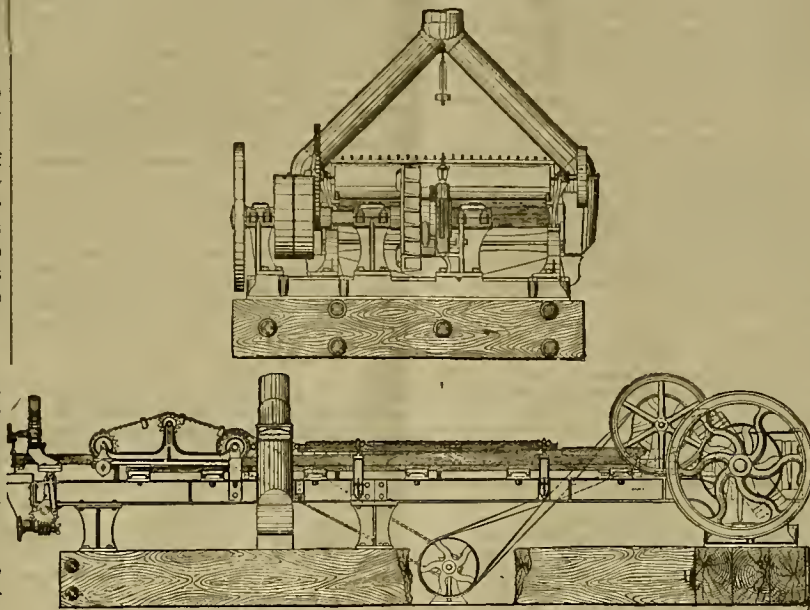
Charles Northey, a miner, coming off shift at the Hallock, Butte, Montana, after his night's work, gave the signal to hoist from the 300 foot level. The engineer carelessly took his foot off the brake before turning on steam, and the result was that the cage dropped. It was about 130 feet from the bottom of the shaft, and, after it had fallen 30 feet or so, the engineer caught it, but stopped it so suddenly that Northey was thrown out and fell to the bottom of the shaft, resulting in his instant death. The deceased leaves a widow and two children.

The Golden Gate Concentrator.

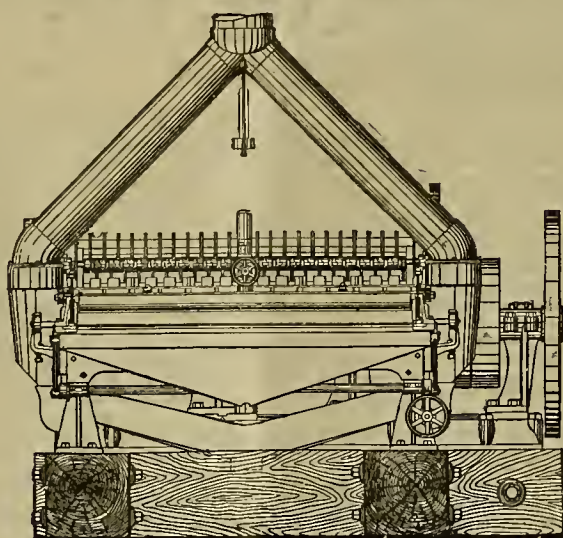
We give on this page engravings of the Golden Gate concentrator. This machine consists of a tray about 11 feet in length resting on a stout iron framework upon which it has a

vacuum, sufficient to sustain a column of four or five inches of water, is constantly maintained by a small exhaust fan. On the lower side of the exhaust pipe, above the protecting plate, are openings into which the gangue and water are drawn, by the vacuum maintained, being then discharged over each side of the machine into the waste-slucio.

The operation of the concentrator is as follows: The crushed ore, with a suitable amount of water, is fed on to the horizontal part of the tray through the distributor shown at the extreme left of the figure. The peculiar motion communicated to the tray causes the pulp to slowly travel toward the protecting plate, and at the same time keeps the pulp in a loose condition, allowing the heavier mineral to sink to the bottom, so that, on arriving at the plate, the pulp is separated into distinct layers, with



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THE GOLDEN GATE CONCENTRATOR.

longitudinally reciprocating movement. This reciprocating movement varies in speed in such manner as to cause the pulp, fed upon the tray at one end, to travel slowly over its surface toward the other end, and the pulp is, by the shaking motion, kept in a loose condition so that the mineral may settle out of the gangue upon the surface of the tray. The tray proper consists of two distinct parts, forming, however, one continuous surface; one part, being designed for the settling of the mineral, is horizontal and has hardly any perceptible current of water, thus allowing the fine mineral to settle out of the water and reach the bottom of the tray; the other part has an adjustable inclination upward from its junction with the horizontal part, and over this part the current of wash-water flows which washes away the gangue from the mineral. At the junction of the horizontal with the inclined part of the tray, and extending across its width, is a protecting plate, set somewhat above its surface and parallel thereto. Above the protecting plate is an exhaust pipe within which a

the mineral at the bottom, the heavy gangue above the mineral, and the light gangue and water at the top. The plate, having been properly adjusted for the ore, allows all the mineral, with some of the gangue, to pass under it, while the larger part of the gangue and all the surplus water pass above the plate, and on arriving at the exhaust pipe are instantaneously drawn off and discharged over the sides of the tray into the waste-slucio. That portion of the pulp which has passed under the plate, now consisting largely of mineral, continues on up the inclined part of the tray, where it can be freed from that part of the gangue which is still mixed with it by a current of water flowing down from the head of the tray, this gangue and wash-water being taken away by the exhaust pipe, as before explained.

This machine has done highly successful work on various classes of ores. It offers to the ore fed upon it a quiet settling space, with very little current, some seven or eight feet in length, whereon the mineral particles, even the finest, may reach the surface of the table, and

after the mineral has once settled upon the tray, it is saved, since in the arrangement and operation of those other parts of the tray intended for the removal of the gangue, especial care is taken to avoid all disturbance of the mineral while it is passing upward to the head of the tray.

It is well known that in order to get the best results from stamps, a large quantity of water must be used, and with concentrators capable of taking the product from a single battery of five stamps, it has always been a difficult problem to dispose of the excess of water; and the various means devised for the purpose have always been the occasion of considerable loss either of fine mineral or of amalgam.

The common expedient of diminishing the battery-water, while decreasing the capacity of the battery and favoring the production of slimes, requires, in order to carry off the pulp with the diminished water supply, an excessive pitch to the battery-apron, and thus prevents the proper amalgamation of the mineral upon the latter. This danger of flooding the ordinary concentrator with water, which is so serious even when it is taking only the product of a single battery of five stamps, of course becomes entirely unmanageable when an attempt is made to run the product of 20, or 15, or even of ten stamps upon a single concentrator.

With the Golden Gate concentrator there is no need of reducing the water supply of the stamp-battery or of giving an undue pitch to the battery-apron, since one of these full-sized tables will take all the water from a 20-stamp battery; and, furthermore, the presence of this large amount of water upon the concentrator, so far from interfering with the process of concentration, is of positive benefit, since, by the large dilution of the pulp, the settlement of the mineral is greatly promoted, and this benefit is generally more marked when treating the more difficult classes of ores.

All the operative parts of the tables are especially designed to favor and promote the prompt separation of the mineral particles from the gangue and water, and, after this separation into distinct layers has once been effected upon the horizontal part of the tray, to avoid all disturbance of the mineral until it is discharged, clean, over the head of the tray.

Its construction and the mode of applying the water used to the concentrator are specially designed to guard against any disturbance of the mineral stratum. This water used, owing to its peculiar construction, discharges the wash-water with a minimum velocity, and is placed, virtually, outside the proper head of the tray. By this disposition a quiet, even flow of water is secured which will not disturb the finest particles of mineral.

With a tolerably clean iron sulphuret ore, concentrating with fair facility, screened through a screen of 60 meshes to the linear inch, this machine will serve a 15-stamp battery; and the loss, it is claimed, will not exceed five per cent. The agents for this concentrator on this coast are Parke & Laoy.

SUPERINTENDENT BUCK of the California Slate Company was in Placerville the other day arranging for the shipment to San Francisco that day of two carloads, or 70 squares, of slate. He has now got his quarry fairly opened, and will be enabled to ship a carload every second day. Fourteen men, all whites, are employed now, and this force will soon be increased, since orders are coming in much faster than they can be filled. This company owns 500 acres of land in the vicinity of Chili Bar. The quarry now being operated by the California Slate Company is but two and a half miles from Placerville. The above is only one of the three quarries in the neighborhood. Messrs. Perine & Mothersole have been taking out slate of the first quality at the Chili Bar quarry for months, and at the Jacob Strahle quarry work was begun on July 3d and is being vigorously prosecuted.

THE Willamette came off the dry-dock at the Union Iron Works the other day. She went on the dock several months ago a collier and now comes off a full-fledged steamer, the sister-ship to the Umatilla, which underwent the same transformation several years ago. The Willamette is now alongside the wharf of the Union Iron Works, where she will be finished and furnished.

SCIENTIFIC PROGRESS.

Science and Veracity.

Prof. T. H. Huxley once wrote as follows: So far as my experience goes, men of science are neither better nor worse than the rest of the world. Occupations with the endlessly great parts of the universe do not necessarily involve greatness of character, nor does microscopic study of the infinitely little always produce humility. We have our full share of original sin; need, greed and vainglory beset us as they do other mortals; and our progress is, for the most part, like that of a tacking ship, the resultant of opposite divergencies from the straight path. But, for all that, there is one more benefit which the pursuit of science unquestionably bestows. It keeps the estimate of the value of evidence up to the proper mark; and we are constantly receiving lessons, and sometimes very sharp ones, on the nature of proof. Men of science will always act up to their standard of veracity, when mankind in general leave off sinning; but that standard appears to me to be higher among them than in any other class of the community.

I do not know any body of scientific men who could be got to listen without the strongest expressions of disgusted repudiation to the exposition of a pretended scientific discovery which had no better evidence to show for itself than the story of the devils entering a herd of swine, or of the fig trees that was blasted for hearing no figs when "it was not the season of figs." Whether such events are possible or impossible, no man can say; but scientific ethics can and does declare that the profession of belief in them, on the evidence of documents of unknown date and of unknown authorship, is immoral. Theological apologists who insist that morality will vanish if their dogmas are exploded, would do well to consider the fact that in the matter of intellectual veracity science is already a long way ahead of the churches; and that, in this particular, it is exerting an educational influence on mankind of which the churches have shown themselves utterly incapable.

The Moral Influence of Climate

Somewhat cognate to the above is the following which we clip from an exchange: "Since the revival of naturalism the tendencies of educational reform make it probable that the progress of moral philosophy will become identified with the development of a new science, thus far only outlined in a few incidental treatises on the interaction of body and mind. The possibilities of that science are suggestively indicated by the results of the statistical studies devoted to one of its branches—the moral influence of climate. Modern French scientists are nothing if not methodical, and have repeatedly called attention to the curious regularity in the geographical distribution of certain vices and virtues; Intemperance, for instance, north of the forty-eighth parallel; sexual aberrations, south of the forty-fifth; financial extravagance in large seaport towns; thrift in pastoral highland regions. It is, indeed, a remarkable circumstance that in the home of the best wine-grapes, in Greece and Southern Spain, drunkenness is far less prevalent than in Scotland, or in Russian Poland, where Bacchus can tempt his votaries only with nauseous vodka. The idea that a low temperature begets an instinctive craving for alcoholic tonics seems disproved by the teetotalism of the Patagonian savages who horseplay every Spanish stimulant-monger without benefit of clergy. The Lashian mountaineers, too, observe the interdiction of the Koran in the icy summit-regions of the Caucasus; but there is no doubt that the bracing influence of a cold climate affords a certain degree of immunity from the debilitating effect of the alcohol vice, and that a Scandinavian peasant can for years survive the effects of a daily dose of alcohol that would kill an Egyptian fellow in a single month."

MINERAL AGGREGATIONS IN VEGETABLE GROWTHS.—It is a singular and as yet unexplained fact that in certain species of vegetable growth there is found a variety of stones supposed to be formed and deposited in their tissues from the siliceous and calcareous juices circulating in their organisms. Thus, in the bamboo a round stone is found at the joints of the cane called "tehasheer." Another curiosity of the sort is the "cocoanut stone," found in the endosperm of the cocoanut in Java and other East Indian islands. Dr. Kimmins describes it as a pure carbonate of lime. It is sometimes round, sometimes pear-shaped, while the appearance is that of a white pearl without much luster. Some of the stones are as large as cherries and as hard as feldspar or opal. They are very rare and are regarded as precious stones by the Orientals and charms against disease or evil spirits by the natives. Stones of this kind are sometimes found in the pomegranate and other East Indian fruits. Apatite has been discovered in the midst of teakwood.

HOW SUMATRA FISHERMEN TEST THE DEPTH OF THE SEA.—On some parts of the coast of Sumatra and the neighboring islands the fishermen test the depth of the sea and also the nature of the sea bottom by the noises they hear on applying the ear to one end of an oar of which the other end is plunged in the water. At a depth of 20 feet and less the sound is a crepitation, similar to that produced when salt is thrown on burning charcoal; at 50 feet it is like the tick-

ing of a watch, the tick being more or less rapid, according to whether the bottom is entirely of coral or alternately of coral and mud, or of sand. If the bottom is entirely of sand the sound is clear; if of mud it resembles the humming of a swarm of bees. On dark nights the fishermen select their fishing-grounds according to these indications.

CURIOSITIES OF MAGNETISM.—Most well-informed people are doubtless aware, remarks a contemporary, that the globe on which they live is a great hall of magnetism, but comparatively few have an adequate idea of the influence this property is continually exerting on all sides; that many common but inexplicable phenomena can be traced directly to this source. Statistics go to show that in the matter of steel rails, as many as 13 will become crystallized and break where they go to make up a railroad track running east and west, before one of those on a north and south track is similarly affected. This is entirely due to the magnetism generated by friction, and the fact that the polarity of the magnetic current is in the former instance resisted in the headlong rush of the train, whereas in the latter case it is undisturbed. Another strange effect of this peculiar and occult force is that exerted on the watches of trainmen. A timepiece carried by the conductor running a train 20 miles an hour, however accurate it may be, will, if the speed of the train is increased to say 50 miles, become useless until regulated. The magnetism generated by the flight of a train may be said to be in proportion to the speed with which it is propelled, and the delicate parts of a watch, numbering all the way from 400 to 1000 pieces, and peculiarly susceptible to this influence by reason of the hammering and polishing they have received, are not slow to feel the effect.

SHADOWS ON THE WALL REDUCED TO A FINE ART.—The making of shadows is becoming a matter of high art in France, where the recent work of a young artist, Caran d'Ache, has come to be distinctly known as "French Shadows." Historical military scenes are favorite representations of this artist at a Parisian theater. Entire armies in their various movements pass across the screen, and in the curious processions the figures of celebrities are so accurately out that they can be recognized. Great combats and the capture of redoubts are shown. The figures are of sheet zinc, about 18 inches high, and are moved before a powerful lamp by several operators, causing the enlarged shadows to be projected on the screen. The flash of artillery is produced by a wad of gun-cotton, the roar of the cannonading by the big drum of the orchestra, the discharge of musketry by a large rattle, and the smoke by a cigarette. Many of the silhouettes, as in the drill where the guns move in unison, act through mechanism, and some are colored in parts by having apertures covered with transparent paper.

IMMENSITY IN THE SIZE AND DISTANCE OF THE STARS.—While the lowest estimate places Sirius, the brightest though not the nearest of the stars, as much as 50,000,000,000 miles away from us, "good authorities," says G. P. Serviss, "regard the distance as being not less than 100,000,000,000 miles, in which case the star's brilliancy must be as much as 228 times greater than that of the sun! And yet even Sirius is probably not the greatest unbelonging to the visible universe. There can be little doubt that Canopus, in the southern hemisphere, is a grander sun than Sirius. To our eyes, Canopus is only about half as bright as Sirius, and it ranks as the second star in the heavens in the order of brightness. But while Sirius' distance is measurable, that of Canopus is so unthinkably immense that astronomers can get no grip upon it. If it were only twice as remote as Sirius it would be equal to two of the latter, but the probability is its distance is much greater than that. And possibly even Canopus is not the greatest gem in the coronet of creation."

THE INFLUENCE OF TEMPERATURE UPON THE VALUE OF BLEACHING POWDER.—John Pattinson has instituted a series of numerous experiments to ascertain the influence of temperature upon the value of bleaching powder, which show that the higher the temperature is, the greater is the loss of the bleaching powder in active chlorine, if kept at such temperature for a considerable length of time. Thus, bleaching powder kept for 11 months at 60° C., lost 6 per cent; at 70° C., 7.8 per cent; at 80° C., 17 per cent, or according to those temperatures 0.55, 0.71 and 1.64 per cent in one month. By this alteration the bleaching powder, which is so-called calcium chloroxyd, is converted into calcium chloride, and the amount of calcium hydrate slightly increased.

HOW A NEW TANNING AGENT IS OBTAINED.—Pyrofusine, the new tanning agent, is obtained by digesting coal tar with caustic soda at a boil, and neutralizing the resulting liquor with hydrochloric acid. The inventor claims it is only half as costly as the hark process and from 20 to 30 per cent cheaper than the alum process.

IT IS SAID THAT SCALES FOR WEIGHING DIAMONDS are brought nearly to that delicacy of balance which would enable deslers to detect flaws in the stones by minute variations in weight. They weigh accurately the 640th part of a carat.

MECHANICAL PROGRESS.

A New Principle in Steam Packing.

Wherever steam pistons have been packed to prevent the escape of steam, the object has been accomplished by forcing the hemp or rings, or whatever was used, against the surface of the cylinder. That this system has been perfectly satisfactory in thousands of cases is undeniable, that it has not always been satisfactory is equally undeniable. That nearly all sorts have been satisfactory in certain cases is probably true, but that any one sort has always been satisfactory no one believes except makers of that particular sort. That the principle embodied in the new plan will always work right is not at all likely, but will, in many cases, I believe, where others have failed. The reason the simple small square rings turned eccentric and sprung in the cylinders do not always prove successful is due to the difficulty in establishing a proper balance between two conflicting conditions; sufficient initial tension so as not to be stuck fast by had oil or abrasion, or liability to unduly wear themselves and the cylinders if given too much seat.

The new principle recently introduced and described by Prof. John E. Sweet, read at a meeting of the American Society of Mechanical Engineers, lately held in Philadelphia, is described as follows: It consists of a common eccentric ring hooked together by a clamp which forms a part of the ring itself, and this hook-clamp limits the expansion of the ring and changes the whole principle of its action. The rings are cast heavy, rough turned very much larger than the cylinder, a piece cut out, sprung together and fitted with the hook-clamp or shoes, left slightly larger than the cylinder and then returned to a tight fit. The rings can compress to a limited extent, but cannot expand. In use they act, or are supposed to act, as follows: When the engine is first started and the hot piston moves to the cold end of the cylinder, the rings compress and allow it to go free; but when both cylinder and piston get up to working temperature, the rings just fit and work without any pressure and very little tendency to wear. Fling out the hooks compensates for wear when it has taken place. It will be seen that the hook-clamp is longer at one end than the other. The object of this is to break joints when two rings are placed side and side in the same groove, and thus cut off the leak that would otherwise take place through the gaps. The hook-clamps or shoes are placed at the bottom of the piston in the horizontal engines, and secured by leaving them a tight fit and allowing the follower to bind them fast.

Behavior of Steel During Hardening.

After an article is dipped to the required depth, it should, if straightness be of importance, be held quite still until reduced to the temperature of the water, because if taken out before, or reduced in temperature, it is especially apt to crack; and it is better to have a deep tank of water, if the body of the metal is great, so that the steel may be dipped slowly downward and become cooled sufficiently rapidly to harden without any lateral movement except it be after the steel has lost its redness.

When a piece of steel requires to be hardened at one end only, the dipping must be performed with a view to make the graduation from the soft to the hard metal extend over a broad section of metal, for if the jointure of the hardened end with the soft metal is abrupt, the hardened end is apt to break short off. The method of dipping, therefore, is, in this case, to plunge the end of the steel vertically into the water to a depth a little more than equal to the depth it requires hardening, and, after holding it still there until blackhot (that is, as soon as its redness has gone) dip it slowly a little deeper, and then raise it out to the amount of the increased dipping, and slowly immerse it again.

When a piece of metal requires hardening and tempering at one part only, we may heat the steel behind the part to be tempered to redness, and dip the article so as to harden the required part, and leave sufficient heat in the contiguous metal to raise the temperature of the hardened part enough to temper it. This plan is usually followed in the tempering of lathe and planer tools, flat drills, etc. If, however, the method of dipping is to hold the steel in the water at an even depth after the immersion, the temper color will be very narrow, while if the steel be raised and lowered in the water, the color-band will be broad.—*Builder's Report.*

CRYSTALLIZATION BY REPEATED HEATINGS. Thomas Edington & Sons of the Phoenix Iron Works, Glasgow, write *Engineering* as follows: We have observed the correspondence on this subject in your journal, and we think our experience may prove interesting. In the manufacture of cast-iron pipes of small diameter, we use as core bars iron tubes made from strips of good quality; these bars are exposed to a temperature of between 600° and 700° Fahr. in the drying stove, and again to a high temperature when the metal is poured into the mold. The result of the repeated heating and cooling is an alteration in a very short time of the structure of the iron from fibrous to crystalline. The stove for drying the cores are heated with gas from a Wilson producer, so that in this case the change of structure can scarcely result from the presence of finely divided carbon. We find

that the wrought-iron in the spindles of core bars for large pipes is affected in the same way. Again we find that the chains, used for suspending pipes in the dipping pans, lose their fibrous structure in a comparatively short time, although the temperature of the coating mixture never exceeds 350° Fahr. Of course, while exposed to this temperature, the chains are always in a state of tension, which will vary according to the weight of the pipes.

WEIGHT OF LOCOMOTIVES.—The size and weight of locomotives have steadily been increased ever since they were first used, and there is little reason for thinking that they have yet reached a limit, although it seems probable that some material change of design is impending which will permit of better proportions of the parts or organs of the larger sizes. The decapod engines built at the Baldwin Locomotive Works, in Philadelphia, for the Northern Pacific railroad, weigh in working order 148,000 pounds. This gives a weight of 13,000 pounds on each driving-wheel. Some ten-wheeled passenger engines built at the Schenectady Locomotive Works for the Michigan Central railroad weigh 118,000 pounds, and have 15,666 pounds on each driving-wheel. Some recent eight-wheeled passenger locomotives for the New York, Lake Erie & Western railroad weigh 115,000 pounds, and have 19,500 pounds on each driving-wheel. At the Baldwin Works some consolidation engines are now in progress which, it is expected, will be still heavier than the decapod engines.

TINNING BY SIMPLE IMMERSION.—Argentina is a name given to tin precipitated by galvanic action from its solution. This material is usually obtained by immersing plates of zinc in a solution of tin containing six grams (about 90 grains) of the metal to the liter (0.88 quart). In this way tin scrap can be utilized. To apply the argentine according to M. P. Marino's process, a bath is prepared from argentine and acid tetratate of potash rendered soluble by borio acid. Pyrophosphate of soda, chloride of ammonium or caustic soda may be substituted for the acid tetratate. The bath being prepared, the objects to be coated are plunged therein, first having been suitably pickled and scoured, and they may be subjected to the action of an electric current. But a simple immersion is enough. The bath for this must be brought to ebullition, and objects of copper or brass, or coated therewith, may be immersed in it.

COMPRESSED PAPER FOR AXLE BEARINGS.—Experiments have recently been made on Prussian railways with axle-boxes fitted with bearings of vegetable parchment in place of brass. The parchment is strongly compressed before being used, and it is thoroughly dried to prevent subsequent shrinkage. Wooden rings are placed on the outside of the bearings, fitting the collars of the journal. An emulsion of water and oil and all the mineral oils are used as lubricants. The parchment soon becomes impregnated with oil, and is able to go a long time without a renewal of lubrication. It is between the body of the journal and the thin edge of the parchment segments that friction takes place. The claim is made that the compressed paper bearings make a tough material that is superior to metal. Such bearings are also in use in a German sawmill, with satisfactory operation.

TEMPERED BRASS.—The art of tempering copper and bronze seems to be made a study in many quarters. We frequently find mention of success in that direction. The latest is as follows. The Milwaukee *Sentinel* says: F. M. Stowe of Winneconne has solved the problem of tempering brass. He has shown an edge tool that will cut a seasoned pine or hemlock knot without affecting the tool, and the various tests he has made proved it superior to steel for cutting purposes, as it takes altogether a finer edge.

READ YOUR MECHANICAL JOURNALS.—The mechanic who thinks he knows so much that he can gain nothing by reading technical papers has either passed or is rapidly passing his field of usefulness. The really valuable mechanic, in the large sense of the word, will go over miles of, to him, old information for the sake of finding one point that is really new. Read your mechanical journals thoroughly and carefully.

A NEW MATERIAL FOR TELEGRAPH POLES.—A new use for cement has been found in England in the making of telegraph poles. The poles consist of an iron shell filled up with the cement or concrete, which incloses a core of wire netting which is carried up the interior. They are claimed to be much lighter than those of cast iron, and practically indestructible.

AMERICAN PUMPS IN LONDON.—An American pump-making concern has heard the British lion in his den by establishing a European office in London. American pumps sell largely in Australia and South America. It cannot be their cheapness, but their superiority that makes them in demand in those far-away countries.

THE INVENTIVE YANKEE OUTDONE.—Give honor to whom honor is due. It is apparent that the inventive Yankee has been outdone for once. An Englishman has invented a resorpting machine. You put your dull razor into a rest prepared for it, turn a crank, and the thing is done.

USEFUL INFORMATION.

A Substitute for Gum Arabic.

The high price of gum acacia has led Trojanowsky to seek for a substitute. This he believes may be found in the mucilage of flaxseed. By boiling the seed with water and precipitating the strained decoction with twice its volume of alcohol, he obtained a substance which, after drying, consisted of opaque, yellowish-brown irregular fragments, somewhat brittle, but not easily reduced to powder, dissolving in water to a turbid mucilaginous solution. Of this, five grains were sufficient to emulsify an ounce of cod-liver oil. The large quantity of alcohol required for the precipitation and the difficulty of drying the adhesive product are, however, serious objections to this product. The author, therefore, studied the subject further, and believes that he has satisfactorily solved the problem.

He still employs flaxseed as the source of mucilage, but by treatment with sulphuric acid he converts this into a gum more resembling acacia. He directs to boil one part of flaxseed with eight of dilute sulphuric acid and eight parts of water until the mixture, which at first thickens, becomes quite fluid. The mixture is then strained through muslin, and to the strained fluid is added four times its volume of strong alcohol. The precipitate is collected on a filter, washed with alcohol, and dried. The alcohol, after neutralizing with chalk, may be recovered by distillation, or it may be used for many purposes without distillation. The gum thus obtained is in the form of translucent, grayish-brown, brittle fragments, easily pulverized, and without odor or taste. Thirty grains of this gum will emulsify an ounce of cod-liver oil, and the product resembles exactly that made by the use of acacia.

Another substitute for acacia, made from starch, has been recently patented in Germany by Sohmann. Two hundred parts of starch are boiled under a pressure of two to three atmospheres with 1000 parts of water and one part of sulphuric or nitric acid, until the mixture begins to be fluid. The acid is then neutralized, and the mixture is again treated under a pressure of three to four atmospheres, until the starch is completely converted into gum-like substances. After filtering through animal charcoal the solution is evaporated at a low temperature. The product is a transparent colorless substance, which is non-hygroscopic, and has essentially the same useful properties as gum arabic.—*Pharm. Era.*

INCREASING THE EGGS.—The white of an egg is albumen; protein makes albumen; cotton-seed meal is rich in protein. These three brief statements bear a close connection to each other. From them can be derived a hint upon increasing the egg production. Hens, to lay abundantly, must be furnished with the materials out of which eggs are formed, and of these materials protein is the most important, as it is the most expensive. But cotton-seed meal containing over one-third of digestible protein helps to solve the problem of obtaining albuminous food for laying hens. But cotton-seed meal should be used judiciously. It is a highly concentrated food, and hens cannot profitably dispose of much of it at one time. If a teaspoonful to each hen, mixed with equal parts of wheat-bran and cornmeal, be given at the start, the fowls will suffer no inconvenience and the quantity can be gradually increased. But a large quantity at a time will never be needed. It is difficult to state what should be the maximum quantity, but a careful observer would determine that by the condition of his fowls. Nothing in feeding can take the place of experienced observation.

COLORS IN LEATHER.—Modern leather manufacturers, says the *Shoe and Leather Reporter*, are surpassing the ancients in the diversity and beauty of the colors they are introducing. Many of the shades produced in upper leather are highly attractive. The Thebans were thought to have attained great proficiency in this art, but the variety of colors they are credited with was meager compared with the iridescent display of our epoch. Remnants of leather found in Theban tombs reveal the use of acacia and other trees in the tanning process. The Jews, after the exodus, probably put into practice the knowledge obtained of this art under the Pharaohs, in preparing ram's skins dyed red for the service of the Tabernacle. The love of colors is as old as the human race. The art of dyeing leather, so long practiced on the Mediterranean, was afterward attained with difficulty by other European countries. But we need no longer go to Egypt or the Mediterranean for instruction concerning it.

THE EFFECTS OF AN EXPLOSION OF AN AMMONIA-TANK.—The Cincinnati *Enquirer* states that an explosion of an ammonia-tank occurred on May 6th at the Buckeye brewery, with a very strange result. Almost immediately after the explosion every bird in the neighborhood fell dead. Chippies, English sparrows and canaries all suffered alike, and after the shock, dead birds could be seen lying about the sidewalks in that locality in great numbers. The explosion caused an alarm of fire to be sent in, and the hose attached to the hose-reel, No. 5, which responded, came near being killed by the ammonia. The animal dashed toward the supposed fire with all the speed he possessed, but

when the strong odor of the ammonia struck his nostrils he was completely overcome and could not move. The horse was at once withdrawn from the place and restoratives applied.

TO EXPEL MOSQUITOES FROM A SLEEPING-ROOM.—Take a sponge dipped in camphorated spirits and make it fast to the top of the bedstead. It will be found largely serviceable; or, take of gum camphor a piece about one-third the size of a hen's egg, and evaporate it by placing it in a tin vessel, and holding it over a lamp, taking care that it does not ignite. The smoke will soon fill the room and expel the mosquitoes, and, even though the windows should be left open all night, they will not enter the room as long as the odor remains. A decoction of pennyroyal, applied to the exposed parts, will generally be quite effectual in keeping off these troublesome insects.

TO DISTINGUISH FRESH EGGS.—The following is a simple French test for telling whether eggs are fresh or not: Dissolve two ounces of salt in a pint of water. When a fresh-laid egg is placed in this solution it will descend to the bottom of the vessel, while one which has been laid the day previously will not quite reach the bottom. If the egg be three days old it will float in the liquid; and if more than three days old it will float on the surface, projecting above the latter more and more as it happens to be lighter with increased age.

A LITTLE KNOWLEDGE A DANGEROUS THING. A little knowledge is certainly a dangerous thing when applied to chemistry. To facilitate the cleaning of a bottle which contained glycerine, a hospital nurse poured in some nitric acid, thereby unintentionally forming the explosive compound nitro-glycerine. The bottle burst in her hands, and her face was badly mangled by the pieces.

A BEAUTIFUL BIRD.—There is a wonderful brown and golden bird in Mexico, a species of bee-eater, that is a remarkably expert bee-catcher. He has a way of ruffling up the feathers on top of his head so that his crest looks exactly like a beautiful flower. When a bee comes along to sip honey from this delusive blossom it is snapped up and devoured.

GLASS FOR POLISHING POWDER.—A very useful polishing powder for metals and glass is made of very finely ground glass mixed with a small portion of dried soda ash.

POLISH bright ironwork with rotten-stone and oil, if it is running machinery.

GOOD HEALTH.

The Use of Water at and Before Meals.

Opinions differ as to the effect of the free ingestion of water at meal-times, but the view generally received is probably that it dilutes the gastric juice, and so retards digestion. Apart from the fact that a moderate delay in the process is by no means a disadvantage, as Sir William Roberts has shown in his explanation of the popularity of tea and coffee, it is more than doubtful whether any such effect is in reality produced. When ingested during meals, water may do good by washing out the digested food and by exposing the undigested part more thoroughly to the action of the digestive ferments.

Pepsin is a catalytic body, and a given quantity will work almost indefinitely, provided the peptones are removed as they are formed. The good effects of water, drunk freely before meals, have, however, another beneficial result; it washes away the mucus which is secreted by the mucous membrane during the intervals of repose and favors peristalsis of the whole alimentary tract. The membrane thus cleansed is in a much better condition to receive food and convert it into soluble compounds. The accumulation of mucus is especially marked in the morning, when the gastric walls are covered with a thick, tenacious layer. Food entering the stomach at this time will become covered with the tenacious coating, which for a time protects it from the action of the gastric ferments, and so retards digestion. The viscid contents, a normal condition in the morning before breakfast, is not suitable to receive food.

Exercise before partaking of a meal stimulates the circulation of the blood and facilitates the flow of blood through the vessels. A glass of water washed out the mucus, partially distends the stomach, wakes up peristalsis and prepares the alimentary canal for the morning meal. Observation has shown that non-irritating liquids pass directly through the "tubular" stomach, and even if food be present they only mix with it to a light extent.—*The British Medical Journal.*

COLD WATER AS A STIMULANT.—SPONGE BATHS.—A sponge bath of cold or tepid water, says *Table Talk*, often reverts one when very tired. This can be taken in 10 minutes, as it is better, if one has not time to do more, to simply wring the cloth or sponge nearly dry and go over the surface of the body once, rubbing thoroughly afterward with Turkish towels, than to omit daily bathing entirely. Those who do household work need to bathe oftener than those who do not, for they certainly absorb more dust and

throw off more impurities, their work being such as to cause them to perspire freely. Pumice-stone, good soap, scrubbing brushes for the hands, lemon juice for stains and vaseline or rose-water and glycerine, or cold cream, should be kept on the shelf over the kitchen sink. To apply one of the last frequently to the hands and also to occasionally rub the face and neck with a dry cloth tends to keep the skin and hands in good condition. When you see the cloth after rubbing you will be amazed to discover that you had so dirty a lace. The face and neck should always be cleansed before going to bed by using a dry cloth or one moistened in tepid water, and cold cream, or something of the sort, applied. For the morning and afternoon washes cold water is more refreshing and stimulating than warm. It is well always to apply an agent after washing, rubbing off and in, when used during the day. By using these means no woman need have the coarse, rough, unnaturally dark skin which is undeniably produced by constant housework, unless some precautions be taken to counteract its effect, and remember, it does not require so much time to take these precautions as to read or think of them. Have the appliances convenient, and after the habit is once formed of using them you will find it harder to forget these luxuries than it was at first to remember them.

CAN A FLY IMPORT RABIES?—We clip the following from the Louisville *Courier-Journal*: Henry Pryor, a laborer at the car works in Jeffersonville, was eating his noon lunch on a recent occasion, when a large fly alighted upon his hand. His attention was attracted to the insect by a sharp pricking sensation that ran through the nerves of his arm. In a few minutes the hand began to swell, the enlargement continuing toward the shoulder. The pain was so intense that he laid off and started for home. Before he reached there his arm had swollen to such a size that his shirt-sleeve had to be cut off. For some reason the pain or enlargement did not continue above the shoulder, except to a small extent. Numerous remedies have been applied to the affected parts, but no relief has been obtained, and Pryor continues to suffer. Yesterday the flesh commenced taking a greenish hue, and it is thought that amputation will be necessary. The physician who is attending Pryor is of the impression that the fly had been on some of the rabid dogs that have been killed in Jeffersonville and had carried the virus with it, inoculating the affected man.

A NEW USE FOR TOBACCO.—A new use has been discovered for tobacco. A father, whose child was dying of membranous croup, remembered how deathly sick he was the first time he chewed tobacco, and, having a pipe in his mouth, without thinking twice, he opened the child's mouth and placed the tobacco in. The father knew it was a desperate act, and he waited in terrible suspense for the result. It came, and quicker than he could have hoped. There was a sudden convulsive movement, and the poor little thing was nearly doubled for an instant, and seemed to writhe in agony, when, throwing herself forward, there shot from her throat a chunk of almost solid phlegm at least two inches long, and having through it a passage no larger than a small lead-pencil. After a few minutes of retching, the little one lay quietly back and slept calmly and sweetly, and the next day was playing around the house with all her wonted vim.

THE FRUIT CURE.—Dr. M. L. Holbrook, a well-known writer on hygiene, paid, in a parlor lecture, a tribute to what may be called the tonic or medicinal properties of fruits. We copy a paragraph of personal experience: "One or two pounds of fresh, ripe fruit daily eaten by most persons would make doctors' visits less frequent. There seems to be a cleansing action to good acid fruit, and especially to the apple and the grape. Children and the young should be allowed all they wish. In Delaware, doctors sometimes send certain patients into the peach orchards and tell them to eat all they want. Wilson, the ornithologist, suffered with a chronic malaria, which his medical adviser could not cure, and he cured himself by eating wild strawberries. I once cured myself of a malaria by going into a vineyard and eating grapes every day for a week, all I wanted, several pounds a day."

HOT WATER WITH LEMON JUICE.—One of the best and simplest remedies for torpid liver or biliousness is a glass of hot water with the juice of half a lemon squeezed in it, but no sugar, night and morning. A person to whom this was recommended tried it, and found himself better almost immediately. His daily headaches, which medicine had failed to cure, left him; his appetite improved, and he gained several pounds within a few weeks. This is so simple a remedy that any person thus afflicted will do well to give it a trial, as it cannot possibly do any harm.

NEW THEORY AS TO THE TREATMENT OF FROST BITES.—A medical journal states that new experiments have changed old theories upon the best methods of treating frost bites. A physician froze 60 dogs into a condition of completely suspended animation. Twenty of these were treated by the usual method of gradual resuscitation in a cold room, and of these 14 perished. Twenty were treated in a warm apartment, and eight of these died, while of the remaining 20, which were put at once into a hot bath, all recovered.

ENGINEERING NOTES.

GREAT PROGRESS IN THE SCIENCE OF TUNNELING UNDER RIVERS.—Great progress has been made, it appears, in the tunneling of the Thames, in view of the construction of cable railways, the latter to run from the monument near London bridge, under the river, thence to the Elephant and Castle, one and three-fourth miles, with a further extension of one and three-fourth miles on the southward side. There are two of these tunnels, the construction of which differs from the ordinary practice, inasmuch as no brickwork is used, but a cast-iron tube made of six segments, each two and one-half feet wide and one and one-fourth thick, bolted together, forming the casing. The joints are made water-tight by hemp-packing. The casting of the clay, which forms the river-bed, is done by an improved machine that makes an advance cut by arms of five feet radius, this being followed by a steel shield one-fourth inch thick, which is forced forward by hydraulic pressure; a space one and one-fourth inch is left between the steel shield and the cast-iron casing, which is filled with liquid quick-setting cement, forced in through holes in the cast-iron segments, filling every space and making the casing perfectly impervious. The alleged advantages of this system are greater economy in construction, no danger of settling, and a rapidity of work equal to 11 feet per day. Another and important feature characterizing this plan is that when the tunnels, which run side by side under the river, reach the shore, the direction is somewhat changed and they run one over the other, thus avoiding the necessity of purchasing private property.

THE NEW YORK AND NEW JERSEY TUNNEL. Work is to be resumed in the fall on the tunnels under the Hudson river from the foot of Morton street to Sixteenth street in Jersey City. Ground was first broken for this great enterprise in 1874, but it was not until 1879 that active operations were begun. Three years later everything came to a standstill, owing to the death of Trenor W. Park, who was the chief financial backer of the enterprise. A little work was done on the north tunnel last year, but the means at the company's disposal were limited. Now, however, it is said some eminent capitalists have come to the relief of the enterprise, and it will be rapidly pushed to completion. Thus far about \$1,200,000 has been expended. It will require only \$950,000 to complete the north tunnel and \$1,250,000 to complete the south tunnel, exclusive of the cost for the ground for freight and passenger depots in New York. In view of the immense amount of business awaiting the opening of this underground highway between the two cities, it would seem that there ought to be no trouble in that wealthy community in raising all the money needed. Everything is in readiness to recommence operations at a moment's notice.

CONNECTING THE ATLANTIC AND MEDITERRANEAN.—The projected ship canal between Bordeaux, on the Atlantic, and Narbonne, on the Mediterranean, France, seems still to occupy the French mind. It would be a vast undertaking, comprising, as it does, a length of 330 miles, to save a voyage around Spain of 700 miles, at an estimated cost of \$130,000,000. It is stated that the plan also contemplates the construction of a railway track along its margin, so that by the use of locomotive towage a speed of seven miles an hour could be maintained by day, and also by night by the aid of electric lights. Thirty eight locks would be required, and the depth of 27 feet would allow of the passage of heavy iron-clads. It is the opinion of many persons high in political and financial influence that the undertaking will be commenced before long. That such a canal must be eventually constructed is beyond a doubt. With the construction of such a work, Gibraltar will lose much of its military value.

THE IDEA OF tunneling the British channel will not down. It crops out anew every year, and will undoubtedly be carried out some time in the near future. The objection of English statesmen to the enterprise is one of the standing jokes of the age at the expense of Johnny Bull. That representative individual cannot bring his mind to properly consider the fact that the danger of a French invasion via the channel tunnel could be made so slight in a few moments as to be utterly unappreciable. A single dynamite charge properly applied at the British end of the tunnel would instantly render it utterly impassable, while if there was a French army in the tunnel at the time the fate of Pharaoh's hosts in the Red sea would be a catastrophe which, in comparison, would be utterly insignificant.

The survey of the route of the Nicaraguan canal is reported to be completed, so far as fixing the general location of the line is concerned. The result of the present survey is the adoption of substantially the same line as that indicated by the preliminary reconnaissance made in 1885. It has been found, so the report goes, that the actual amount of excavation required will be somewhat less than the estimate based on the earlier examination of the ground. Altogether, the outlook for the future of this important work—which is especially an American enterprise—is most encouraging.

The United States consumes more rails and railroad supplies than all the rest of the world.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH CON.—Ledger, Aug. 25: This property is still idle and no telling when the long period of idleness is likely to come to an end. A report is in circulation that an effort will be made to open the mine on the first of next month; but so many reports of this nature have been circulated heretofore, which proved false, that very little dependence can be placed in these rumors. It is the universal belief that whatever fire may have existed in the mine, it has long since died out. One reason for the delay—and no doubt there is some truth in it—is that it would be impossible to work the mine now, if it were opened, owing to the lack of water. This is the season when water for mining purposes begins to wax short. The canal company only began to draw upon the Blue lakes reservoir recently. There has not, however, been such a great demand for water this season, owing to the stoppage of the Plymouth mines, and the supply in consequence seems to be larger than at this time last year. Still it is probable that it would soon be exhausted if the Plymouth Consolidated were to draw upon the canal. The most likely view of the situation is that an effort will be made to open the mine and place it in running order, so that when the fall rains insure an abundant supply of water, the mill will be prepared to recommence the work of pounding the precious metal from its native matrix.

MISCELLANEOUS.—The Amador gold mine continues to develop splendidly. The rich ore-body reported last week holds out remarkably well. Not much headway is being made toward the construction of the mill; but there is no hurry about it, as the mine is far from being in a condition to keep a 60-stamp mill in operation. The Zeile has not commenced sinking yet; but the putting in of the tank at the 800 level is nearly finished. From 15 to 20 stamps of the mill are kept running. The North Star shaft is down 640 feet and drifting at the 600 level will be started next week.

SUTTER CREEK GOLD MINE.—For the week ending Aug. 22, the mill has lost four days on account of slackness of water. At present the mill is running to its full capacity. The developments in the mine the last week are very encouraging. Upraise from tunnel No. 1 broke through to surface opened up a large body of ore which would keep 40 stamps in operation for years to come. The company is now contemplating an addition of one more stamp to their present mill and a permanent making shaft.

SUTTER CREEK.—The Wildman mill, which has been hung up for a couple of weeks on account of sinking, was started again this week. The dumps are all full. They intend to run the mill in the daytime only.

Calaveras.

SPARROW HAWK.—Chronicle, Aug. 25: Some very rich ore is being taken from this mine, located about half a mile south of Rich Gulch. The owner has prospected to the depth of 50 feet, coming upon a well-defined vein of quartz four feet in width in slate formation, with gouge or inches thick on the hanging and about four inches thick on the footwall. The vein shows a tendency to still further increase in width with greater depth.

GREEN MOUNTAIN GRAVEL MINE.—Work here is suspended for want of water. It is well opened up and the gravel is rich. As soon as water for motive-power can be obtained, work will be commenced upon a 30-foot breast. There is an eight-stamp mill upon the mine run by water-power under a pressure of 275 feet. Twenty-five inches are used and run through a 3/4-inch nozzle. Each stamp weighs 650 pounds, dropping a distance of 11 inches, with a speed of 90 drops to the minute. Quarter-inch screens are used, and during a run of 10 hours from 70 to 75 carloads are put through the mill. The extent of the gravel deposit in this mine will make it a first rate mining property for years to come.

Del Norte.

HYDRAULIC MINES.—Record, Aug. 25: The sale of one of our best hydraulic properties is reported, the buyers being San Francisco and St. Louis parties. O. D. Campbell and S. Peck, mining experts, who have been to Morick Hill looking at the mine of R. W. Miller and H. Mulkey, went below on the steamer Thursday. They have bonded the mine for 60 days for the Scott's Bar Mining and Milling Co. The amount of the bond is \$20,000. Wm. T. Grider, James Camp, John Titus, George Meamber, Mary P. Grider, L. F. Coburn and Jacob Marhoffer have located 93 acres in Siskiyou county for a placer mine.

Inyo.

SENDING ORE TO ENGLAND.—Independent, Aug. 25: During the past year Samuel Chalmers has made repeated efforts to sell ore from a mine in Deep Spring district, in the Inyo mountains, east from Alford. The ore carries copper and other metals. None of the reduction works in California or Nevada would offer satisfactory terms to Mr. Chalmers and he has made arrangements to ship his ore to Swansea, Wales. He can ship large quantities of the ore; he is now stopping out ore and sorting at the mine.

Mariposa.

ON THE FREMONT ESTATE.—Gazette, Aug. 25: The owners of the Mariposa estate have put experienced miners at work on the different mines on the Grant to prospect the hidden treasure stored there. The reports made of these operations will determine the future actions of this syndicate in regard to the property.

Nevada.

VARIOUS MINES.—Transcript, Aug. 26: The Badger Hill diggings, owned and run by the Quick brothers, have been idle for about 10 days. Grangers did it. The mine gave employment to several men. Its owners are cleaning the bedrock in their claim. The Bald Mountain extension at Forest City has struck lava in its gravel operations, and as a consequence is not working at much profit. The South Fork (also gravel), located in the same section, is looking well. The Red Ledge Company, whose works are situated midway between Pike City and

Forest City, have built a steam sawmill on their property and commenced last week to turn out lumber, which will be used in their prospective quartz-mill and in other buildings which they intend erecting at the mine. The employees of the Alaska mine were docked 10 per cent on their last pay-day. The agreement under which the men work is, that they are to receive \$3 a day if the mine produces enough to allow of it, after deducting the running expenses of the month. Owing to the purchase of dies and other material last month, Receiver Jackson had to pay off at the rate of 90 cents on the dollar. During the week we were shown several pieces of rock taken from the Junction ledge. The quartz was heavily charged with sulphures, while here and there a speck of the precious metal was to be seen. As we stated last week, the ore from the Junction contains a number of metals, of which gold, silver and copper are thought to be present in quantities sufficient to warrant the rock being worked for all three.

Napa.

OPENING A SILVER MINE.—Callistogian, Aug. 22: The shaft of the Callistoga Consolidated Mining Co. is down about 40 feet. It is being sunk at the side of the vein. At a depth of 50 feet they will crosscut the vein to ascertain its width and value there; if satisfactory, then the shaft will be continued down 50 feet further, and preparations made for opening the mine. Where the quartz has been cut a little in sinking the shaft thus far, the indications are very favorable for finding good ore.

Placer.

RICH SPECIMENS.—Republican, Aug. 25: Some of the finest and most beautiful gold specimens found in the country continue to come from Duncan Hill. The gold is of a peculiar texture like fine lace, and rich is no name for it. The White boys out there are doing well in their claim, and old miners say the hill is just full of gold. There must be plenty of it where there are so many good prospects.

MAYFLOWER.—The tunnel here is being pushed ahead, and Sunday morning was in 5261 feet. At the Live Oak they are running a drift to connect with the Naugatuck tunnel by a raise from the low tunnel. The raise has passed 15 feet of quartz gravel. The ground is very wet from the large quantity of water pouring down. There are good expectations from the present work.

ALONG THE MIDDLE FORK.—Supt. Dodge has run a tunnel, 150 feet in length, across the upper end of Boston Bar, through which he has turned the river. This tunnel is 1800 feet above the cut in Horse-shoe Bar, which was run last winter. He is now stripping and working this 1800 feet of ground with good results. Breese & Wheeler have cleaned out the cave in the breast, and are putting on a large force of men. The Baker Divide is still running its prospect tunnel ahead. Gen. Hamilton has got the boiler in position at the Dardanelles mine. The mill has been running since Monday. The gravel is very rich. Few men are employed at the Red Point mine just now, owing to the lack of water. The company is laying water-pipe in the ditch. Quite a large force of men is at work at the Hogsback.

Plumas.

VARIOUS MINES.—National, Aug. 25: The Edman mine is paying better than ever. It is marvelously rich. The Pittsburg Co. has its tunnel in about 200 feet on the Poplar valley quartz, with good indications for a paying ledge. It is reported that the Bell mine is about to be again opened up by some lower country parties. Orr, Bushman & Co. start their quartz-mill on Black Hawk to-day. The big tunnel on the Consignee mine, at the mouth of Jamison, is progressing very favorably. F. B. Whiting has built a house and made many other improvements at French Ravine, and will commence work on the ledge immediately. Rich developments may be expected in the near future. A shaft is to be sunk on the mine on Chapparel hill.

Sierra.

PORT WINE.—Mountain Messenger, Aug. 25: Considerable prospecting is in progress hereabout, and many tunnels have been started. At Waboo, two miles southeast of Port Wine, 23 men are employed. The main tunnel is in 1700 feet and will soon be in pay gravel. It is expected that 150 men will be working here next year. John H. Frissel, contractor, is making good headway with the tunnel.

ST. LUIS.—Tunnel of the Excelsior Drift G. M. Co. is in 554 feet, and an air shaft is 350 feet from tunnel mouth. Enough T steel rail is on hand for 2000 feet of tunnel, 600 feet 7-inch air-pipe, black-smith shop and boarding-house. A good wagon-road, three-quarters of a mile, extends to the Port Wine and St. Louis road. Gravel is expected 250 feet ahead. Two shifts, two men each, are working. Rich gravel has been taken out of the adjoining Caledonia claim.

BUNKER HILL.—Nick Berets is busy as usual at Bunker Hill, and hopeful as ever of happy results. At Deadwood, under the direction of Mr. S. Miller, Liberator Co. is extending its main tunnel. They had some pay gravel down an incline and water drove them out. Bunker Hill Co. run its main tunnel northeast, thence the branch tunnel, to tap 42 shaft southeast with fair-looking gravel in face of the branch main tunnel. Seven men are working in the mine.

Siskiyou.

RICH STRIKE.—Union, Aug. 25: Considerable excitement prevails on Humburg over the discovery of a rich gold-bearing ledge near the Eliza mill. The find was made by Thornton Thomas, known among the miners as Big Tom. The ledge is ten inches wide and is so thoroughly impregnated with gold that it can hardly be broken off. It is said to be the richest discovery ever made in the country.

VARIOUS ITEMS.—Yreka Journal, Aug. 29: The Hegler boys and Bruce Aldrich have been crushing quartz steadily all summer at their mill on Humburg creek. Water is getting short, however, during the middle of the day, and may oblige them to shut down awhile if the hot weather continues much longer. One of the Lemay boys is now busy hauling quartz from the Siskiyou mine to the Orr & Pyle mill at forks of Humburg, and as soon as it is crushed a lot of quartz on the dump of the old Cornish ledge will be hauled down for crushing. H. L. Herzinger, who has been working successfully a drift-mining claim on Klamath river, nearly under the Anderson ferry, in Siskiyou county, will open another similar claim on Oregon bar, further down the river. He reports the country about the Klamath

and the streams emptying into it being well prospected now. A large number of men are scouring the hills, and some report promising finds. Mr. J. H. Crossman, of the State Mining Bureau, an expert in mining matters, has just returned from a month's trip to the Salmon river section and along Klamath and Scott rivers, in his researches. During his trip he has discovered very rich mining-fields and many natural curiosities of great benefit to the scientific world.

Trinity.

ON STEWART'S FORK.—Journal, Aug. 25: Good quartz has been found on this stream, the ledge being about 10 feet wide and the rock going from \$10 to \$20 or \$30 per ton. Further developments will be made soon.

KNOW-NOTHING CREEK.—The mines here are looking very well. The discoveries made last spring are developing favorably, and more new discoveries are frequently made. The Hansen mine is looking about as usual. The arastra is kept running constantly on good ore with satisfactory results. The company is now running a deep tunnel to tap the vein at a depth of 150 feet, which will give them a large area of stoping ground. They are now in 225 feet and expect to strike the ledge at any time, probably within a distance of 20 or 30 feet. A track is being laid and cars will be used in running out the ore as it is stoped out above. The Know-Nothing mine is developing well. The ledge varies from 6 to 20 inches and consists of good milling ore. The timbers are out for the four-stamp mill and the machinery is on the ground. An ore-chute and bin have been built, holding 150 tons of ore. A flume is in process of construction, three-fourths of a mile in length, for the purpose of bringing water to the mill. The water-supply is enough to run the mill the year round. It is expected that the mill will be running by the first of November. The Hungry Hill mines have closed down for want of water. The others are well satisfied with the season's run, and as soon as the fall rains set in operations will be resumed. The Gilta mine has been leased by Hancock & Junkins. They have sunk or it 20 feet and are well satisfied with the indications for a good property and good pay for their labor. There are now about 50 men in the camp and everything presents a lively appearance.

Tulolumns.

STRIKES CONTINUE.—Independent, Aug. 25: Strikes of more or less value are continually coming to light in some of the mines. Reports of this week state that the two Phillips brothers, working a mine near Quartz mountain, have taken out considerable money lately, and that the rock goes \$25 to the pan. We hope the chute will stay with them.

NEVADA.

Washoe District.

COMSTOCK MINES.—Territorial Enterprise, Aug. 27: The ore-producing sections of all the leading mines are looking well, and such companies as have command of milling facilities are extracting all the ore that their mills can reduce. Others, not being able to mill their ores, are extracting none. They are taking advantage of the vacation to put their mines in thorough repair. Also they are making extensive explorations for the purpose of opening up bodies of ore for further reference. At the Brunswick mill (where steam-power is in use) the usual amount of Confidence ore is being worked. The Alta steam-mill at the mine is running steadily. The concentrates are rich—worth \$500 a ton. The Justice folks are grading a site for a new mill. It will be a short distance below the mine, on the site of the old Woodville mill. There are on the dump, ready for reduction, 2500 tons of ore. The dynamos for the Nevada mill have not yet been received. All is now running well at the California battery and pan mills as regards the transmission of power. Times will remain as at present until the fall rains give a milling stage of water in the Carson river. Below we give such information as we have been able to obtain in regard to the leading Comstock mines.

CON. CAL. & VIRGINIA.—The east crosscut from the south drift on the 1300 level is still being advanced in a mixture of quartz and porphyry showing metal. On the 1300 level are continuing to extract ore from the southeast drift run from the upraise parallel north drift, 58 feet above the track floor. On the 1600 level the stopes around upraises Nos. 1, 3 and 4 are yielding the usual amount of ore. From the south drift from the Ophir line, 36 feet above the track floor of this level, ore is also being extracted.

ALTA.—All is running well and smoothly in both mine and mill. The ore now being worked comes from the 825 level. The station at the 925 level is completed, and a drift from that point out toward the vein is out 60 feet. The concentrators work well. They save from 15 to 16 tons of concentrates a month, which average about \$900 a ton. Good headway is making in the Keystone shaft, now down 216 feet.

HALE & NORCROSS.—All the ore-producing sections of the mine continue to look well. Are shipping about 600 tons a week to the Nevada mill. The most of this comes from the 600 and 700 levels. The average assay is \$42 a ton. The west drift from the 500 station is out 110 feet. Repair work on the main shaft is continued. A good deal of work is being done in the way of exploration.

BELCHER.—The 500 crosscut is now in 181 feet, with no change in the ground to report. Have completed the work of putting in guides in the middle compartment of the shaft and are making excellent progress in repairing the south compartment. The Suro tunnel drift is out 615 feet. The rock is hard but blasts well.

BEST & BELCHER.—El Dorado level: West crosscut No. 1, started from the main northwest drift, has been extended seven feet; total length, 82 feet. The formation is clay and quartz. Are repairing the north drift on the 1300 level.

CROWN POINT.—On the 700 level the south drift from the main crosscut is 71 feet. The ground shows no change worthy of note. The drift from the Suro tunnel level is out 615 feet. The rock is hard but blasts well.

UTAH.—On the 372 level the north drift has been extended 50 feet; total length, 492 feet. The formation is porphyry, showing some water.

CONFIDENCE.—A good deal of repair work is being done in all parts of the mine, yet the usual

shipment of 180 tons of ore per day is being made to the Brunswick mill. The average assay value of the ore is \$26.58.

WEST YELLOW JACKET.—Raising in high-grade quartz. Have not yet connected with the incline, are nearing it and likely to make the connection any day. This connection will give a much-needed circulation of air.

UNION CON.—Work on the 1300 level is suspended. Good progress is making in the joint Mexican drift on the 1465 level. It will reach the Mexican line in a distance of 250 feet.

OPHIR.—On the 1465 level the old east drift is reopened 153 feet. The southwest drift from upraise No. 2, 36 feet above the track floor of this level, is still being retimbered.

OCCIDENTAL.—Upper tunnel; 150 feet below the upper tunnel, in the boiler winze, the south drift has been extended 6 feet; total, 60 feet.

SIERRA NEVADA.—East crosscut No. 3, on the 520 level, is out 214 feet. The face is still in porphyry. There is a small flow of water.

ANDES.—On the 320 level the north drift is still showing some ore. The drift south on the 240 level is in a promising streak of quartz.

IOWA.—All in and about the mine is in good working shape. No change in any part worthy of note since last report.

CHALLENGE CON.—Prospecting on the 1000 level and some repairs throughout the mine are still being carried on.

CON. IMPERIAL.—Repairs to the main north lateral drift on the 1700 level are still going on.

BULLION.—Are drifting south on the 650 level and are crosscutting east on the 500 level.

SEG. BELCHER.—Timbering and repairing is the principal work at present in progress.

SAVAGE.—Owing to lack of milling facilities no ore is being extracted.

Belmont District.

ON THE SPANISH BELT.—Courier, Aug. 25: The Barcelona mine, Spanish Belt, is looking well. The south end of the mine is producing rich ore, some of it assaying as high as \$3000 in gold and silver. We would like to see the Monitor Belmont mill repaired, and the high-grade ores reduced at home. They ought to be just as successfully treated here as at Salt Lake or San Francisco. The low-grade ores will be concentrated at the Belt as soon as the new mill is built. The Barcelona will be an extensive producer of the metals. The lone chloriders are shipping their ore to Sodaville for treatment.

Candelaria District.

MOUNT DIABLO.—Walker Lake Bulletin, Aug. 25: Have stopped the west drift on the sixth level and are sinking on the ore found in this drift, and have about six inches of \$30 ore showing. The north crosscut between the fifth and sixth levels on the east side is in 116 feet and shows ledge matter in the face assaying \$19 to-day. The stope between the fourth and fifth levels, near the one winze, shows about three feet of \$80 ore. The east drift between the fourth and fifth levels is in 214 feet and the face shows some low-grade ore. The stope above the fourth level, near No. 2 winze, is giving some \$80 quartz. We have started a stope on a bunch of 570 quartz between the second and third levels east of the shaft, and the prospect is favorable. The hanging stope between these levels west of the shaft shows two feet of \$100 ore. The ore in the east stope on the second level is of rather low grade, averaging about \$35. The intermediate stopes between the first and second levels are yielding the usual amount of ore. The mill has been running steadily during the week.

ABOUT HAWTHORN.—The Kinkead mill is now crushing ore from the New York. Jim Waddell took a small lot of rock to Pollard's mill, Silver City, last week. Eight bars of bullion, four from the Mount Diablo and four from Garfield, were shipped below last week.

Taylor District.

RAINS AND MINES.—News, Aug. 25: The Monitor Co. is shipping \$1000 a week. Most of this is produced from tailings. The late rains have played the mischief with the roads between here and Eureka, which has made our mails a little late for the past few days. The heated spell is over and we may now look for fall weather.

Tuscarora District.

RICH COPPER ORES.—Cor. Silver State, Aug. 21: A district rich in high grade copper ores is now being opened in the northeastern part of Elko county, up near the Idaho line. Some ore was taken out here and shipped East 10 or 15 years ago, but it did not pay, as the price of copper ore was then very low while freight charges were very high. Under present changed conditions it is thought these mines can be worked with profit, as the deposits appear to be large and the ore carries a high percentage of copper with some gold and silver. For a month past four miners have been at work taking out ore. Shipments will be made from this point to Argo, Colorado, at once—in fact, two "sixes" are now on the road with ore for shipment. It is their intention to ship a carload a week. The new camp is attracting a good deal of attention from Idaho parties. At least a score of locations have been recorded in addition to those made by DeLano & Allen. Scarcely a day passes without some new prospecting party making its appearance in the district. It is 50 miles from Wells, the nearest railroad point. DeLano & Allen are trying to arrange for the erection of a smelter. They have unbounded faith in their properties, and are sure that they can make a success when a smelt r is erected on the ground.

ARIZONA.

MOHAVE REGION.—Miner, Aug. 25: At the sampling works the following lots of ore were run through last week: Jamison & Stinson, one car; C. O. D., two cars; Morrissey & Winston, one car. The lessees of the Hackberry mine shipped a carload of ore this week. The claim recently discovered by Henry Ewing in the Peacock mountains near the Crescent mine is looking well and considerable work will be done on it in the next few weeks. The McCracken mine, under the management of Judge Murphy, is being cleaned out and put in good working shape, and everything bids fair for the resumption of work on this property at an early date. John Morrissey was in town this week, having a 12-ton lot of ore from the Oro Plata worked at the sampler,

Morrissey & Winston have a lease on a portion of this mine, and expect to make frequent shipments hereafter. M. D. Howell of the C. O. D. Mining Co. was in town this week looking after a shipment of two carloads of ore. He will put about 15 more men to work in the mine this month, and hopes to largely increase the output. The Signal Mining and Milling Co. has got to a point in its mining operations where it becomes necessary for the economical working of their mine that they procure hoisting machinery, and it is not definitely known whether the company will go to this expense or not. The latest news from the O. K. Mining Co., which is prospecting for water in the Wallapai Valley, is that the well is down to the depth of 200 feet and still in loose gravel, and that the work is temporarily suspended, awaiting the arrival of more pipe, which is expected every day. The lessees of the Crescent mine have struck in the bottom shaft at a distance of 160 feet, from 8 to 14 inches of silver ore, which will assay from 200 to 1400 ounces. Messrs. Barrett, King, Pierce & Opie have been at work about two months cleaning out the mine and sinking, and can now reap the reward of their labors. Mendes & Rogers have a lot of ore from their gold claim at the sampler. John Campbell and B. Moses are working the Sinclair mine at Mineral Park, and are getting out some very good ore. The American Flag boys had six tons of ore brought down this week, which went, as all ore from that mine does, in the neighborhood of 600 ounces per ton. John K. Mackenzie had a six-ton lot of ore from the new strike in the Cupel worked this week, and it brought him 262½ ounces per ton. There is a good deal of this same class of ore yet in the Cupel. The sampling works this week worked the following lots of ore: C. O. D., two cars; Cupel, six tons; Waterbury, Carey & Gordon, one car; American Flag, six tons; Steve Smith, from the Attata, six tons; H. P. Ewing, a small lot from the Short Starter. A new strike has been made in the Rattan mine in sinking the shaft. The ore in the new strike is of different character from that heretofore struck in this mine, and assays \$50 in gold and \$150 in silver, and the pay streak is about eight inches wide. H. P. Ewing was in from the Peacock mountain with his first lot of ore from his recent strike, which he calls the Short Starter. It went 352 ounces to the ton.

ORE MOVEMENTS AND DEVELOPMENTS.—Prescott Courier, Aug. 27: Shull & Austin's big freight trains arrived recently from Congress mine with 24,000 pounds of shipping ore, left yesterday for the mine with a lot of machinery, including a boiler, which weighed 8000 pounds. Great activity is reported at Jerome. Smelter running, four saloons, two stores and another going up, roads leading to the camp crowded with men and teams. An enormous body of lead ore has been developed in the Lead Chief mine, Black Rock district, below Walnut Grove dam. Plenty of running water and timber in immediate vicinity. Eight tons of ore which Geo. Sines had run through the sampler yesterday went 555 to the ton. The Rapid Transit mine in the Bradshaw district is yielding very rich silver ore, some of which will soon be brought to the Prescott sampler for treatment. The mines belong to the same group as the Oro Bonito, Oro Bella and Mollie Stark. People who have seen the mines are enthusiastic in their praises of same, and it is predicted that it will be the banner mining camp of this section.

BRITISH COLUMBIA.

KOOTENAY.—Donald Truth, Aug. 18: At Porcupine creek enough lumber has been whipsawed for sluice-boxes, etc., and the creek turned from its bed in several places. Two of the companies will begin washing next week, and, no doubt, gold dust will be a common medium of exchange and barter in Donald within a month. Work on the Constance and Atlanta group of mines at Jubilee is progressing in the consolidated shaft as rapidly as three shifts of men can send it down. They are running through pockets of ore that look rich, and the indications are favorable for striking the ledge at no great depth. When they do, it will increase the value of every location on the mountain 100 per cent. The canal to connect the Columbia and Kootenay rivers at Grohman is progressing well. Two-thirds of the work is already completed, and the contractors, Sinclair & Gamble, who are carrying out the work for the company, are about to commence the lock. There is a hunt for tellurium and gold in the Windermere district.

COLORADO.

ABOUT CRESTED BUTTES.—Pilot, Aug. 25: The summer is rapidly passing away and the mines that we had expected to be active in shipping ore are pretty much in the same condition that they were last winter. It is true there is a carload of ore shipped occasionally, but for the number of mines and the amount of mineral there is in this country there should be several carloads shipped every day. The present developments of the Tennessee tunnel in Ruby Hill show the rock to be a black lime, which is a very good indication of mineral. Put is very hopeful of striking a good body of mineral very soon. A contract of over 20 feet has just been completed on the Buffalo lode by George Hale and Gus Schuman. This claim is situated in Poverty gulch. The contractors report the vein looking better when they quit work. The Metzler concentrator shipped a carload of concentrates that were made from Ruby Chief dump this week.

COKE AND COAL.—Col. J. M. Shoonmaker, one of the heaviest operators in the Connellsville region, has purchased 2000 acres of coal land in Colorado, and has erected ovens on it. The coke made is not as good as Connellsville coke, but as it has an advantage of \$15 per ton in freight it is in good demand among the silver smelters. Samuel Mott is prospecting for coal on lands belonging to Peter O. Anderson, on the hog-back northwest of town. There were shipped from Crested Butte during the week ending Aug. 22d, 91 carloads of coke and 222 carloads of coal.

GEORGETOWN MINES.—Courier, Aug. 25: The Mineral Chief is being opened at six places by as many sets of lessees. The openings extend 800 feet along the vein and five of them show mineral. It begins to look as though this discovery is indeed the mineral chief, and will develop the greatest body of ore ever seen in the county. Between 60 and 70 men are employed in the Terrible mine and a dozen levels are being driven ahead. Pending the reorgan-

ization of the company, which has been assuming ahead for a year past, the management is not desirous of leasing ground, hence the diminished number of men employed. The new company will be called the Colorado Silver Mining Company, limited, of London, England. The lessees on the Coin have broken into a four-inch vein of way-up ore. They were working last month on a low-grade ore. The Cowles brothers have struck what appears to be a good vein of silver on Lincoln Mt.; surface material runs 600 ozs per ton. A vein of solid ore more than 12 inches in thickness has just been struck in the Peruvian lode, the other side of Argentine Pass.

DAKOTA.

DEADWOOD DISTRICT.—Pioneer, Aug. 21: Fires were started in the Hartsfeld smelter at three o'clock yesterday afternoon. It was not intended to begin running through ore until eight or nine in the evening. Reports therefrom may be looked for to-day, and it is hoped they will prove as satisfactory as parties interested desire. The ore recently shipped by the Seabury-Calkins averaged \$150 per ton. Work goes on steadily, and more rock of like quality is being extracted every day. Coke for the Hartsfeld smelter did not reach Galena Thursday as was formerly announced, but was received about two o'clock yesterday afternoon. It was talked last night that a party of three or four mining men of large means will arrive to-day, to look over property at Bald mountain and Ruby basin, with a view to purchasing. The Cora has made several shipments of ore to Omaha recently, and proposes sending forward another carload the coming week. Lynn, Sebastian & Delaney are about sending a carload of ore from the Ontario, Galena, to the Omaha Smelter Works. Pay ore has been struck on the Hard-scrabble ground, situated near the Tornado group, Bald mountain. A telephone from Galena to John Baker last evening stated that yesterday's run of the Merritt smelter was decidedly the most satisfactory to date. More ore had been run through, and more bullion turned out than for any one preceding shift. Two hundred and fifty ore sacks were received at the Northwestern office yesterday. They will be used by a Bald mountain company which proposes beginning extensive shipments to Omaha.

ON THE "SPANISH R."—Operations at present are principally on the 170 level, where a large body of carbonate ore is disclosed. In the future, shipments in carload lots will be regularly made to Kansas City at intervals of five or six days. The ore runs average between \$50 and \$60 per ton, and enough is in sight to warrant that the mine will continue to be operated profitably for a long time to come. The Horseshoe Comet has about completed the cut-off tunnel, and will resume ore shipments before the close of the month. Five mining corporations are pushing developments at Carbonate. They are Iron Hill, Seabury-Calkins, Spanish R., Adelphi—under lease—and Hartshorn.

IDAHO.

SEVEN DEVILS.—Recorder, Aug. 21: All the experts who have visited the Seven Devils district agree in the assertion that it is the largest and richest copper camp in the world. A rumor is current that a rich strike of high-grade ore has been made in the Kentucky mine at Shoup, specimens being taken out richer than any heretofore seen. Free gold in solid nuggets as large as peas were found in this body. Placer mining in the various gulches has been more prosperous than anticipated in the spring. What was lacking from the light fall of snow last winter has been made up by the frequent showers during the summer. Most of the placer mines are cleaning up for the season. The Red Warrior gulch difficulty has been settled. J. M. Patterson has been reinstated as superintendent and H. N. Thomas appointed foreman. The building of the mill is progressing. Popham Bros. have recently discovered a ledge in the Boyle mountain region which carries about two inches of very good looking lead ore—carbonates and sulphate. Mr. Popham says they have sunk 100 feet on the vein and taken out three or four sacks of good ore; ore that will assay from 100 to 150 ounces silver and 50 per cent lead. The prospect seems to improve with depth and may turn out to be another good property on that mountain. The discoverers are very conservative in the estimate of the ledge, and justly so, for, as Mr. Popham says, "it never pays to lie about a prospect." The Relief force of 14 men was laid off this morning. Unable to see H. E. Miller on the subject, a reporter learned from good source that the shut-down is to allow of an estimate of the ore taken from the Relief ground by the Minnie Moore. It is said a compromise in a certain prominent mining man's estimate is likely to occur as a result of damages, and to allow of an accurate survey it was thought best to close the Relief until his arrival. This explanation indicates that the work will soon be resumed.

THE ORO FINO.—Statesman, Aug. 28: As work progresses on this mine the confidence in it is being strengthened, by reason of good ore being found in the drifts now being run on it. The mine is being put in the very best condition for the extraction of ore, an immense quantity of which is already in sight, and which will be taken down by the time the new Oro Fino mill is ready to start up. The more development work is done the better the mine looks. The tunnel in the Sinker ledge is being pushed as rapidly as possible and is now in over 400 feet with good ore in the vein.

THE SILVER KING, OF IDAHO.—Since our last report on this mine, carload No. 6, 37,933 pounds, and carload No. 7, 24,084 pounds, have been marketed, realizing \$4406.29 and \$2445.73, respectively. Lot No. 8 is now being delivered at the Ketchum Sampling Works. It will be a 15-ton car, and on the average of former shipments will realize over \$3000, and make the total value of ore marketed in the past two months from this mine upward of \$26,000 for about 110 tons, an average net value per ton of nearly \$250, after payment of railroad freight and treatment charges. The ore as shipped averages over 300 ounces silver per ton. From parties who have visited this mine recently we learn that the showing is something wonderful, the development of a great ore-chute continuing right along, presenting one of the most perfect mining formations and a demonstrated fact as a big mining proposition. Operations are skillfully conducted with meager and faulty facilities, and every move counts, as it must, to mine, prepare and market from so remote a locality

—lacking reduction works there—and pay heavy royalties, yet realize handsome profits to lessees. Reduction works of most any crude, practical nature would enhance the profits greatly to both owners and lessees, and the latter may be justified in some move to acquire a plant for even their temporary use.

NEW DISTRICT.—A new district has been discovered southeast of Silver City about 15 miles, which promises well. The lodes are large, gold bearing, and are in granite formation. Several locations have been made. The district is called Webster, after the discoverer.

NEXT BOOM.—Wood River Times, Aug. 22: The next big mining boom will be near Salmon City, in Lemhi county, as soon as the Manitoba gets within reaching distance.

BUTTERCUP.—The recent developments in the Buttercup have attracted quite generally the attention of mining men and others interested in the mineral resources of this country. Yesterday a sample of ore from the face of the tunnel, on the ground of the recent strike, was assayed, and it went 833 ounces silver per ton and 77 per cent lead.

SHEEP MOUNTAIN.—Cor. Idaho World, Aug. 16: To give an estimate of the number of men in these parts would be guesswork. The mountains are full of men, prospecting, and all think this will make a lively camp. New locations are made almost every day, some of which are very rich. Some of the old locations are being worked with great interest, and are looking well.

NEW MEXICO.

KINGSTON AND VICINITY.—Shaft, Aug. 23: The outlook of the camp is very encouraging, more so probably than at any time in its history. The new strikes on the Templar, Keystone, Enterpriser and Hornet continue to improve; and besides ore has been found in new places in the Eclipse, Sweepstakes and Savage, while the London and Charm ore bodies are widening and improving. Several new companies with capital to open up and develop mines now lying idle, are being formed. The Enterprise keeps on sinking shafts and extracting ore, the deposit growing richer as the work advances. Samples of extremely rich gold ore are being taken from the Hornet mine. The imports of Mexican lead ore are reported as 7000 tons per month. This does not include shipments which reach this country by water or the immense quantity of lead, which the rulings of the treasury department admit free. A carload of ore from the Black Colt mine netted \$9700 at the smelter. The Silver Bell is getting some good ore, not in large quantities as yet, but very rich. The report that ore was found in the Sciota on the Tierra Blanca was a mistake. The Log Cabin looks better and better every day, and developments show that the ore bodies go down and grow richer. Telluride ore has been discovered on the Enterprise. Thus Kingston shows up to be a mining camp. The Black Colt shipped 18 tons of 200-ounce ore last week.

MONTANA.

FROM VARIOUS MINES.—Review, Aug. 26: Work has been suspended by the Montana Mining and Milling Company. It is believed that they have drifted over the vein. The St. Louis mine, located on the Drum Lummum hill, at Marysville, also is reported as improving with depth. The Gold Leaf and Easter on Towles gulch developed with a tunnel and a new lead is expected to be cut this month. The ore is free-milling gold. The Carbonate, three miles from Marysville, is looking better than ever. The tunnel is being driven ahead as fast as possible, and the pay streak is widening. The ore is galena. A gold-mill is to be erected in the Yoga district, upper Judith country, for working the ores of the Golden Chariot and other gold ledges in that vicinity. A good many such ledges exist in the district and great success is predicted for the mill. Work will be commenced next week on the Allison lode at Marysville. There is a tunnel on this property over 200 feet long, but work will be done in the shaft. The ore vein is three feet wide free-milling gold. Several of the Russell group of mines on Red Mountain will commence operations as soon as the Montana Smelting Company can take care of the output. Then Rimini will be one of the busiest mining camps in Montana. The Drum Lummum mine is now engaged in putting in the largest hoist in Montana, it not in the country. It is located 600 feet under the ground, and is capable of hoisting to a depth of 5000 feet. A large excavation has been made at the 600-foot station for the hoisting plant, which will be walled and arched with solid masonry. It will be placed in position as fast as workmen can be procured to do it. Within the past few days ore of good quality has been struck in the lower tunnel of the Belle mine about 190 feet from the surface. This is a contact vein, between slate and syenite or quartzite, and every indication points toward its becoming a good property. At the Pearl mine the shaft is down some 60 feet below the tunnel level, some of the ore taken out in sinking showing considerable ruby silver. Sinking is now going on at the rate of 2½ feet a day, and the same favorable outlook continues.

ABOUT BUTTE.—Inter-Mountain, Aug. 27: The crosscut at the bottom of the shaft on the Harris & Lloyd is showing up a fine body of ore. The depth is about 320 feet, at which point they were some 30 or 40 feet behind the footwall. The crosscut, after cutting the footwall, went immediately into ore, and at last accounts they had four feet of high-grade copper ore, and about 10 feet of good concentrating ore. Since the above was placed in type it is learned that another strike was made this morning. The ore body next to the footwall was 17 feet thick, five feet being high-grade. Then they cut through a nine-foot dyke of country rock and this morning struck another body of high-grade copper-silver ore, which is supposed to lie on the hanging-wall. At noon they have penetrated it five feet. The purchase of the Kelly & Kohrs interest in the Gambetta, mentioned last week as decided upon by the Boston & Montana Co., was concluded at Deer Lodge through Clark & Larabee's bank. The amount paid was \$20,000 cash. The Combination Co.'s mines at Black Pine are looking well, and in two faces in particular they have a fine showing of ore. Their net profit for last month was about \$7000, and they count upon at least \$5000 per month profit for an indefinite period. The Orphan Girl, Orphan Boy and two or three other properties composing that

group are to be thoroughly explored by the gentlemen who have them under bond. The proposition is to put down a shaft on the Orphan Boy to the depth of 800 feet, and the belief is that an immense mine will be opened. They commenced drifting on the Narrow Gauge some two weeks ago from the lowest point reached by the shaft, 170 feet. They had a narrow seam of ore at the shaft and this has widened to several inches of 800 ounce ore, inclosed on either side by about two feet of ore of a good grade.

MIDDLE FORK.—Livingston Enterprise, Aug. 27: Many items are going the rounds of the press in regard to the Middle Fork or upper Judith country. That whole section of the country, in fact the whole Belt and Little Belt ranges of the mountains, are full of mineral, but that district in particular contains many fine bodies of ore, and one of the largest mining camps in the Territory will some day be located in that section. In speaking of recent work there, an exchange says: The Middle Fork country is yielding some very rich gold ore. In the ground formerly owned by J. D. Weatherax, the tunnel has been driven to a considerable depth, and by making an uprise and sinking a winze a breast of 20 feet of free carbonate ores has been developed that runs from \$4.50 to \$18 a ton. The arastra which has been running on this ore was closed by Mr. Colling, he considering an arastra process entirely too slow for so fine a mine. He made arrangements for a more full development of the mine, assuring the other owners that he would find a way of reducing the rock, once the mine is developed.

OREGON.

CRACKER CREEK AND VICINITY.—Happenings, Aug. 22: The general outlook of the mines of Baker county improves as developments progress. This not only applies to the great Cracker Creek district, but to the districts adjacent, viz.: Cabell Cove, Onion Creek and Greenhorn Mountain, as well. New discoveries are continually being made. The recent sale of a group of mines at Greenhorn to Denver capitalists for the sum of \$100,000 has given quite an impetus to mining in that section. The favorable showing of the La Bellevue mine at Onion creek, owned by J. B. Cabell, gives evidence of the mineral wealth of that section. The placing of a crusher and concentrator on the property within the next 30 days will put this mine in the front rank of ore-producers of the county. At Cracker Creek district everything is a bustle of excitement, occasioned by the extensive work being done on the big mines there and their fine showing. At the Eureka and Excelsior mines 75 or 80 men are employed in and about the mines. At the Columbia a large force is at work. The same at the North Pole, Golconda and others. In fact, work is progressing steadily all along the line from the mouth of Cracker creek for a distance of ten miles. It is probable that one or more mills will be erected at Cracker creek this season. The Oregon Gold Mining Co. contemplates putting a 40-stamp plant costing in the neighborhood of \$100,000. The company has already ordered the mill from the East, and its arrival here may be expected within the next few weeks. The owners of the Columbia also contemplate placing a mill, but whether it will be done this fall or not is not yet known. It is safe to say that by another year three or four mills will be in operation on the mines of Cracker creek.

NEW MINING DISTRICT.—Situated one and one-half miles east of Haines, the first station north of this city, on the O. R. & N. railroad, has been discovered a new mining district that gives promise of great richness in gold and silver. Yesterday afternoon I. B. Miller and J. W. Hall brought a wagon-load of ore to this city from their locations, the Crown Point and Silver Bow. They have made arrangements with the managers of the old quartz-mill to crush the ore. This is the second wagon-load brought by them to this city within the past week, the yield of the first lot being very satisfactory.

UTAH.

ABOUT PARK CITY.—Salt Lake Tribune, Aug. 27: Work on the Ontario three-mile drain tunnel is being pushed vigorously, a large force of hands, soon to be increased, being now employed on the enterprise. The bore is 7 feet 6 inches high in the clear; 5 feet at the top of the sill and 7 at the bottom, and the work is being done in a most thorough manner. It is in over 60 feet, in hard rock, and an average of one foot per shift is driven; but as soon as the power drills are in operation, probably by Oct. 1, much faster progress can be made. Work will soon be resumed on the Whitehead group and in the Deer Valley tunnel. Both of these properties are near the line of the big drain tunnel, and a bright future is before them. Hughes & Bogan are working the first west extension of the Wasatch, and are attaining favorable results. They have encountered ore, a sort of iron speckled with galena. A report comes from a source which ought to be trustworthy to the effect that an amicable settlement of the Grant-Shaughnessy litigation over the Glencoe property is being made. Seventy-five men are employed at the Crescent, and about 150 tons of ore come down over the tramway daily. The big incline shaft which is down 250 feet is nearly free from water by the pumps, and it is thought that sinking will be resumed in a few days. Sundberg & Johnson have been awarded the contract to run a 40-foot drift to the ledge from the 100-foot level in the Himalaya, under Scott Hill. They have cleared up the wreck of last winter's snow-slide and commenced work with a vim. The west drift in the Massachusetts, from the 600-foot station, is already in about 60 feet, and upward of five feet a day are made.

THE LUCKY BILL.—Since the 1st of June 24,000 shares of this company's stock have been sold at 25 cents a share, leaving 16,000 shares yet in the treasury. The stockholders' certificates will not be issued until all of the working stock is disposed of. This speaks well of the estimate of worth placed on the property, particularly because nearly all of the stock has been sold to persons living in town. Burton & Firmstone have taken a contract to run the tunnel 500 feet farther to the northeast, along the course of the ledge. When finished, this will make the length of the tunnel under Flagstaff hill 1150 feet, and it is expected that with such a depth the ore-body will show up big. The Lucky Bill is a good property destined to become one of the new ore-producers of the camp before long. A rich strike is reported in the McCune mine.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

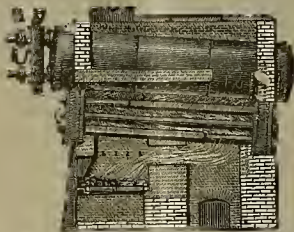
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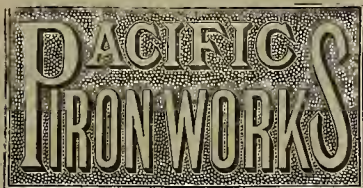
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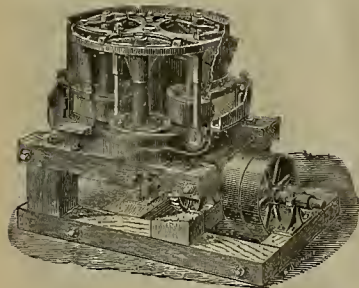
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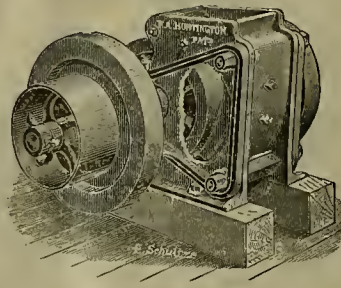
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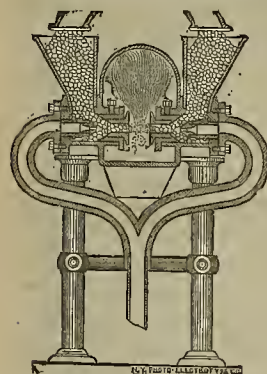
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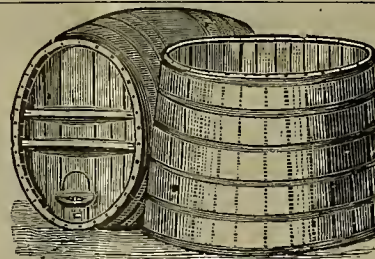
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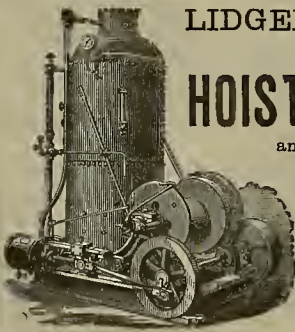
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Birth and Death of a California Stream.

EDITORS PRESS:—Four years ago, near the summit of the Sierra, was a mountain valley. Beneath its pines in the early spring lay the cloak of snow that, slowly melting, trickled tributary to a central stream. This silver thread among the green now rushed roaring over the fall, now hurried among the pebbles, now idled in the glassy pool, now sulked in eddies, but still pushed on and on to the diatant and thirsty plain. Like the youth who leaves his home and loving parents, his relatives and friends, all for the glittering and grasping world, so this stream left the singing pines, the faithful spruce, the friendly alder, and abandoned the fragrant cedar and the bay for the gold and gain of toil.

It speeds to the plain, some to the permanent grasses of the pasture, some to springs and wells in the grain lands, and some to the field of the husbandman. Let us follow this offshoot in the furrow through a dark green grove of oranges. First it seeps into the ground, then mounts the tree and glistens in the foliage and fruit. How round and bright the orange grows. Soon our stream is boxed, and rattles off in train after train to the noisy marts of men. Now comes a transmutation, and our stream held so sweetly in the rounded orange is turned to gold and travels back again in goods or double-eagles to the worker in the fields.

Some years pass by and we look again into the mountain valley. The lumberman has been there first. The cold steel of his ax has laid low the trees—not a patriarch was spared. Next came the herder. He finds the dead tree-tops tangled in the brush and his sheep impeded. To clear a way he sets his fires. The breeze that so little while ago was whispering sweetly with the forest leaves, inconstant, now fans the flame that burns their ruins. Not only this, but it hurls the young saplings and the sheltering shrubs, aye, even the seeds of the forest are consumed. Thus, with the power of reproduction gone, the forest family tree is cut off root and branch.

What a cruel change of prospect is there now. The valley erst so green and shady, with its trees and flowers and banks of snow, is now bleak and dark. We now look sadly on the splintered stumps of our old tree friends, blackened with the fire-flame. The skeletons of the bushes are stretching out their charred remains as though calling still to heaven for help, and nothing meets the eye but desolation. There is no snow now, and our noisy brawler, the brook, has quite disappeared. The silver line is there, but instead of green it is lined with mourning black; instead of water it is now broader of sand, gravel and rock.

A little way down was a bee-ranch. The stands and house were saved, but the flowers of the chaparral and of the trees are gone. The bees, without food, are dead, and the place is deserted. Down in the plain some of the fields are covered with sand and gravel. The county tax is higher because bridges washed away must be rebuilt; railroad travel was interrupted and the irrigating ditches are dry. The stream that ran clear to fertilize for the farmer and to rejoice the rambling angler is no more. During the snows and rains, however, there is a turbulent torrent and a most truculent traveler who will stay in no given course, and whose baggage of sand and stones is dumped in the fields and orchards. From the mountain it descends to destroy, and floods without fertilizing.

So the world's history is being repeated in California. The mountains are being burned and bared, their water-holding power is being destroyed with the forests, and the plains and valleys just springing into fertility are threatened by the torrent on the one hand, and by the demon of drouth on the other.

The forest of the mountain gives fruit to the plain. The forest is the friend of the farmer, but the farmer will not put out his hand to help this friend now sore pressed on every side.

The lesson has been learned in other lands by bitter experience. It seems that this is the only way that we can learn the lesson in America.

Santa Monica.

Mining Share Market.

It remains "stale, flat and" to some of the insiders not "unprofitable," and this because they possess the art of extracting "blood from a turnip." Then somebody seems to be quietly gathering in certain stocks, but for what purpose only those in the secret can tell, and this adds occasionally a little more life to the market. The "chippers-in," too, with their noise and affectation of business, do a little in the same direction, and so the industry is kept on its legs, with a show of something being done all the while. Quotations for this week remain as before, shares having undergone the customary slight variations without any general advancement. The present would seem to be a good time to buy this class of "securities," it being perhaps equally as good a time to sell.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Ontario, Aug. 22, 16,905 ounces; Daly, 23, 10,589 ounces.

Mines and Mining in the Okanagan County.

EDITORS PRESS:—The Salmon River district and city are situated in Okanagan county, Washington Territory, being distant from Spokane Falls 160 miles. The first mineral discoveries in this vicinity were made in May, 1886, on the Salmon river, a tributary of the Okanagan. In September of that year additional discoveries were made at two points four miles farther south, these being now known as Salmon City and Ruby City.

The ores in the Salmon district consist mostly of galena and gray copper, with also some of the chloride and sulphuret varieties. They are mostly high grade, and with the exception of the chloride can be readily concentrated. The concentrates run from \$200 to \$2000 per ton. The principal claims here are the La Euna, Columbia, Homestake, Tough Nut, Hidden Treasure, Pointer, Lone Star, Lady of the Lake, Eureka, Washington, Ida May and Wellington. The principal claims at Ruby are the Colville, Black Hills, Blue Bird, Peacock, Gray Wing, War Eagle, Idaho, Poorman, Fairview, Cleopatra, First Thought, Delta, Bay Horse, Monitor, Arlington, Pomeroy, Hula, Arizona, Bockeye, Ruby, California, May and Spokane.

These being sulphuret ores, easily concentrated and rich in silver, effectually solves the transportation problem, as the concentrates are rich enough to bear carriage to even the most distant points. These will shortly rank among the most important mining camps in the Northwest.

The Okanagan is a beautiful region abounding in grazing lands, lakes and forests, and a more picturesque mining district or a more agreeable climate it would be hard to find.

This is a pleasant climate, not extremely warm in summer nor cold in winter. Though pretty well north and the altitude between 3000 and 4000 feet, the winter temperature is modified by the "Chinook," the warm wind which during that season often comes in from the ocean.

The Oregon Navigation Company has put a steamboat on the Upper Columbia running above Priests' rapids. It made its first trip only a few days since. As this brings water transportation within 20 miles of this place, it will greatly reduce the price of freights, heretofore rather high.

T. YOUNGER.
Salmon, Okanagan Co., Washington Ter., July 21, 1888.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING AUG. 21, 1888.

- 388,252.—HYDRAULIC DREDGING APPARATUS—A. B. Bowers, S. F.
388,253.—DREDGING MACHINE—A. B. Bowers, S. F.
388,337.—DREDGING APPARATUS—A. B. Bowers, S. F.
388,177.—AUTOMATIC GAS-LIGHTING AND EXTINGUISHING DEVICE—R. F. Bridwell, S. F.
388,180.—CAR-HEATER—Carter & Pickett, Canyonville, Ogn.
388,371.—STATION INDICATOR—T. W. Munroe, S. F.
388,231.—CAR-COUPLING—J. P. Turney, Ailing-ton, Ogn.
15,800.—TRADE-MARK—D. McC. Gedge, S. F.
NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC GAS LIGHTING AND EXTINGUISHING DEVICE.—Richard F. Bridwell, S. F., assignor by direct and mesne assignments of two-thirds to Henry H. Allen and Mary Pendergast of same place. No. 388,177. Dated Aug. 21, 1888. This device consists of a clock-work mechanism, which causes the revolution of two cams. One of these operates a lever, which, through proper connections, turns a valve and admits gas to the burner. At the same time it operates another lever, which, through suitable mechanism, draws an electric sparking lever back to position, so that when the cam relieves the main lever, the sparking lever is thrown by its spring past the burner, and its electric contact thereby emitting a spark and lighting the gas. The other cam in its turn operates the first lever to turn the valve back, and thus cut off the flow of gas to the burner. Provision is also made for running the lamps on the moonlight schedule by rendering the mechanism inoperative at any given period.

A NUMBER of capitalists have taken the initiatory steps for incorporating a company for the purpose of utilizing the water-power of the Truckee river for operating stamp-mills and mining machinery on the Comstock, the power to be transmitted from dynamos operated by that stream to the lode on copper wire.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Belcher M Co.	Nevada.	35.	50.	July 18.	Aug. 22.	Sept. 12.	J. Crockett.	327 Pine St.
Bullion M Co.	Nevada.	34.	50.	Aug. 4.	Sept. 7.	Sept. 24.	R. R. Grayson.	327 Pine St.
Baker Divide M Co.	California.	16.	25.	Aug. 15.	Sept. 17.	Oct. 8.	D. M. Kent.	330 Pine St.
Chollar M Co.	Nevada.	25.	50.	July 29.	Aug. 23.	Sept. 11.	C. E. Elliott.	328 Montgomery St.
Champion M Co.	California.	31.	10.	Aug. 8.	Sept. 10.	Sept. 29.	T. Wetzel.	522 Montgomery St.
Found Treasure M Co.	Nevada.	3.	3.	July 12.	Aug. 17.	Sept. 7.	J. Stadfeld Jr.	309 Montgomery St.
Great Western Q M Co.	California.	1.	1.	July 17.	Aug. 24.	Sept. 14.	A. Halsey.	328 Montgomery St.
Golden Pledge M Co.	California.	13.	40.	July 31.	Sept. 1.	Oct. 19.	J. W. J. Gleason.	328 Montgomery St.
Keyes S M Co.	Nevada.	2.	50.	July 16.	Aug. 23.	Sept. 23.	M. P. Minor.	328 Montgomery St.
Lone Jack M Co.	California.	2.	10.	July 11.	Aug. 16.	Sept. 7.	J. J. Scoville.	309 Montgomery St.
Locomotive M Co.	Arizona.	3.	15.	Aug. 21.	Sept. 24.	Oct. 15.	A. H. Fish.	309 Montgomery St.
Lady Washington M Co.	Nevada.	7.	25.	Aug. 21.	Sept. 25.	Oct. 16.	L. Osborn.	309 Montgomery St.
Live Oak D. M Co.	California.	10.	05.	Aug. 20.	Sept. 27.	Oct. 19.	J. Morizio.	328 Montgomery St.
Mayflower Gravel Co.	California.	42.	50.	July 31.	Sept. 3.	Sept. 25.	J. Morizio.	328 Montgomery St.
Mexican M Co.	Nevada.	35.	25.	Aug. 9.	Sept. 13.	Oct. 3.	C. E. Elliott.	309 Montgomery St.
Navajo Queen M Co.	Nevada.	1.	20.	Aug. 3.	Sept. 5.	Sept. 24.	J. F. Hollins.	533 Kearny St.
Potosi M Co.	Nevada.	20.	05.	Aug. 10.	Sept. 5.	C. E. Eli.	328 Montgomery St.	
Pondera M Co.	Nevada.	1.	05.	Aug. 10.	Sept. 1.	Oct. 10.	J. Stadfeld Jr.	309 Montgomery St.
Scott Bar M Co.	California.	5.	10.	July 26.	Sept. 3.	Sept. 20.	W. Richardson.	218 California St.
Sierra Nevada M Co.	Nevada.	92.	25.	July 10.	Aug. 14.	Sept. 1.	E. L. Parker.	309 Montgomery St.
Spring Valley G M Co.	California.	3.	10.	July 19.	Aug. 25.	Sept. 24.	H. Hicher.	328 Sansome St.
Savage M Co.	Nevada.	70.	50.	Aug. 3.	Sept. 5.	Sept. 25.	E. B. Holmes.	328 Montgomery St.
Superior M Co.	New Mexico.	3.	15.	Aug. 15.	Sept. 15.	Oct. 15.	I. C. Stump.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Amador Queso M Co.	California.	R. Ellor.	310 Pine St.	Annual.	Sept. 21
Booker M Co.	California.	G. W. Sessions.	309 Montgomery St.	Annual.	Sept. 4
Con Excelsior & Gold King M Co.	Nevada.	W. F. Perry.	308 California St.	Annual.	Sept. 10
Con Bituminous Rock Co.	Nevada.	W. Beck.	58 Flood Building.	Annual.	Sept. 12
Grand Prize M Co.	Nevada.	R. R. Grayson.	327 Pine St.	Annual.	Sept. 18

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Aug. 10
Confidence S M Co.	Nevada.	A. S. Groth.	309 Montgomery St.	1.00.	Aug. 6
Con California & Va M Co.	Nevada.	H. P. Hutton.	309 Montgomery St.	25.	Aug. 27
Con California & Va M Co.	Nevada.	R. W. Heath.	318 Pine St.	50.	Aug. 27
North Belle Isle M Co.	California.	J. W. Pew.	310 Pine St.	50.	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50.	July 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightfoot.	309 Montgomery St.	50.	Aug. 8
Standard Con M Co.	California.	A. H. Clough.	330 Montgomery St.	1.00.	June 12
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	05.	June 10

San Francisco Metal Market.

WHOLESALE.

THURSDAY, August 30, 1888.	
ANTIMONY—French Star	9 @ 71
BORAX—Refined	7 @ 7
Powdered	7 @ 7
Concentrated	6 @ 7
COPPER—	
26 @	26 @
Sheathing	26 @
Ingot	26 @
Fire Box Sheets	26 @
Iron (Clengarnock ton)	26 @
Eglington ton	26 @
American Sift. No. 1, ton	26 @
Oregon Pig. ton	26 @
Shot Lane White	26 @
Shots, No. 1	26 @
Bar Iron (base price) 9 lb.	26 @
LEAD—Pig	5 @ 00
Bar	6 @ 25
Sheet	6 @ 25
Flue	6 @ 25
Shot, discount 10% on 500 lbs	Drop, 15 @ 50
Buck, 7 lbs	17 @ 50
Offhand, do.	19 @ 50
STEELE—English, lb.	15 @ 20
Black Diamond tool	10 @ 00
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4 @ 5
TRIPPLATE—Oke	8 @ 75
Charcoal	7 @ 25
QUICKSILVER—By the flask	35 @ 00
Flasks, new	1 @ 06
Flasks, old	8 @ 00

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

The inhabitants of San Ramon valley, Contra Costa county, are considerably elated over a gas well which was struck a few days ago within 100 yards of the schoolhouse in the town of San Ramon, and near the center of the valley. The Stone boys were boring a well to supply the school with water, when at a depth of 35 feet they struck a strong flow of natural gas, and upon a torch being applied to the hole at the surface of the ground the gas caught fire and burned at a furious rate for a few minutes, the flames mounting up several feet and then following down into the hole until the moisture extinguished the flames.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 9.	WEEK ENDING Aug. 16.	WEEK ENDING Aug. 23.	WEEK ENDING Aug. 30.
Alpha	1.20	1.55	1.25	1.45
Alta	1.00	1.45	1.05	1.20
Andes	.85	1.10	.70	1.00
Belcher	2.40	3.70	2.35	3.45
Brophy	2.80	3.80	2.50	3.35
Best & Belcher	.60	1.15	.40	.75
Bullion	.55	.80	.40	.65
Bullion	.55	.80	.40	.65
Belle Isle	1.50	1.80	1.25	1.45
Bodie Con	1.50	1.80	1.25	1.45
Benton	1.50	1.80	1.25	1.45
Bodie Tunnel	1.50	1.80	1.25	1.45
Bullion	1.50	1.80	1.25	1.45
Con. Va. & Cal.	7.00	9.50	6.00	7.75
Challenge	3.15	4.20	3.00	3.80
Champion	2.70	3.75	2.50	3.25
Chollar	1.25	1.75	1.00	1.35
Confidence	1.25	1.75	1.00	1.35
Con. Imperial	.25	.45	.25	.35
Caledonia	.25	.35	.30	.35
Con. Pacific	.25	.35	.30	.35
Con. Point	.25	.35	.30	.35
Crocker	.60	.80	.50	.65
Central	.35	.50	.30	.40
Dudley	.35	.50	.30	.40
East B. & B.	.35	.50	.30	.40
Excelsior	5.25	6.25	5.00	6.00
Grand Prize	1.75	2.30	1.05	1.35
Gould & Curry	2.65	3.10	2.50	2.95
Hale & Norcross	4.50	5.75	4.00	4.85
Independence	.20	.30	.25	.35
Iowa	.20	.30	.25	.35
Julia	.20	.30	.25	.35
Justice	.20	.30	.25	.35
Kaweah	2.30	2.95	2.00	2.40
Lady Wash.	.30	.35	.25	.30
Martin White	.20	.30	.25	.35
Mono	1.00	1.25	1.00	1.25
Mexican	2.40	3.40	2.50	3.30
Northern Belle	2.20	2.25	2.00	2.10
Navajo	1.45	1.70	1.55	1.65
North Belle Isle	3.00	3.35	2.25	2.90
Niagara	1.75	2.40	1.50	2.00
Occidental	1.00	1.25	1.00	1.25
Ophir	4.40	5.40	4.00	4.85
Potosi	1.50	2.50	1.50	2.25
Peerless	1.10	1.60	1.00	1.35
Peer	.40	.50	.40	.45
P. S. Star	2.10	2.75	1.90	2.40
Savage	2.10	2.75	1.90	2.40
S. B. & M.	2.80	3.40	2.25	2.85
Sierra Nevada	2.10	2.95	2.25	3.15
Silver Hill	.40	.50	.40	.45
Silver King	.45	.60	.40	.55
Scorpion	.45	.60	.40	.55
Syndicate	.45	.60	.40	.55
Union Con.	2.50	3.20	2.50	3.20
Yellow Jacket	3.25	4.00	2.50	3.25

Sales at San Francisco Stock Exchange.

WEDNESDAY August 29.	
180 Hale & Nor.	4.40
235 Alta	1.55
50 Justice	.95
300 Mexican	.85
50 N. Belle Is.	2.45
325 B. & Belcher	3.10
50 Bullion	.55
50 Potosi	.20
200 Belle Isle	.45
350 Ophir	4.50
435 Con Va & Cal.	8.20
610 Crown Point	3.75
290 Crown Point	2.55
500 Grand Prize	1.05

New York Metal Market.

Telegraphic advices dated Aug. 30th give the following New York prices:

BAR SILVER—91 1/2 per oz.
BOKAX—90.
COPPER—LAKES—\$16.86.
IRON—No. 1, \$22.00.
LEAD—\$4.32 1/2.
TIN—\$21.00.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Steady, spot closing at \$16.70 @ 16.80. Transferable Notices (Lakes) issued at \$16.50 @ 16.60.

Please Remit.

Too large a number of our subscribers are in arrears on this paper. Now that we have been a little overkind to such, there is the stronger reason that they should make an extra effort to remit the amount due us for subscription without further delay. We have been very earnest and sincere in presenting a paper to each and every one of our subscribers well worth the price asked for it when paid in advance, and in justice to ourselves we must now insist upon all subscribers in arrears paying up. While to each individual the amount is small, collectively it is large to us, and we are obliged to urge settlement.

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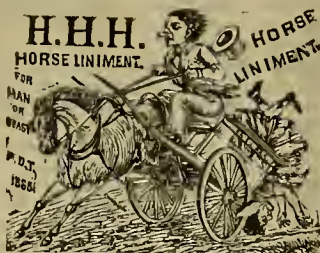
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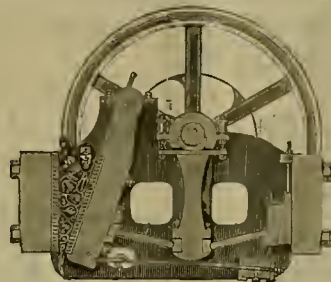
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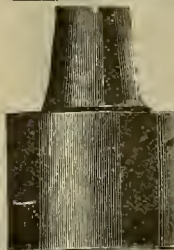
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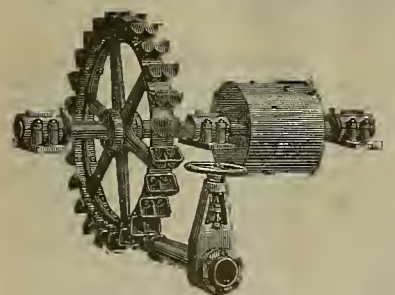
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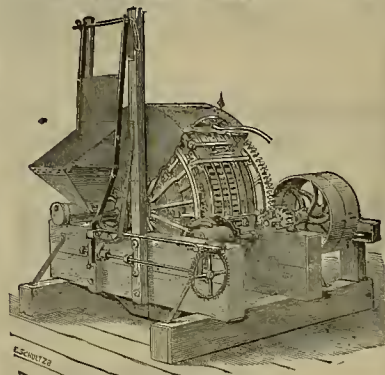
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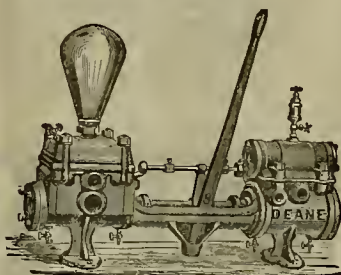
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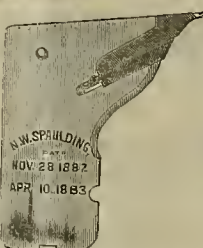
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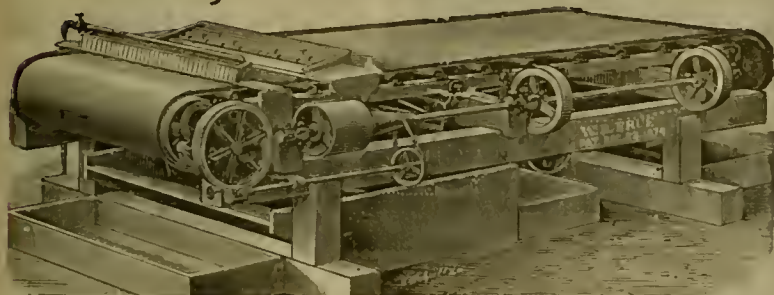
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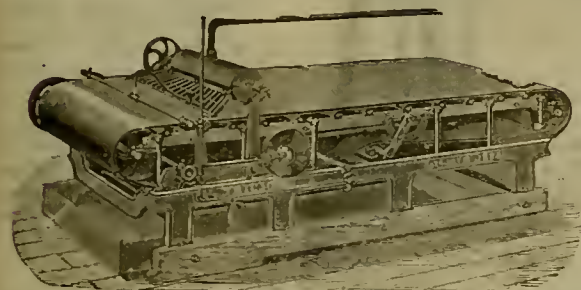
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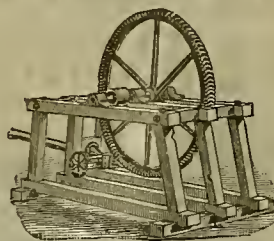
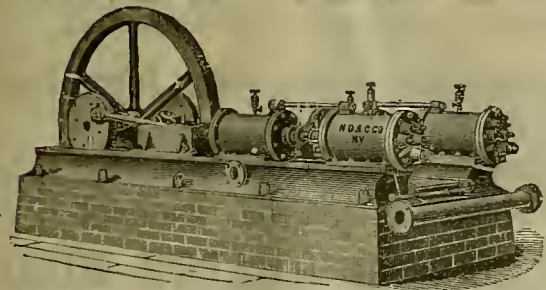
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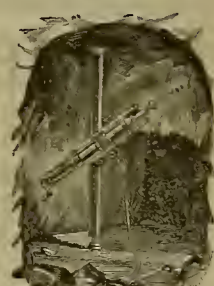


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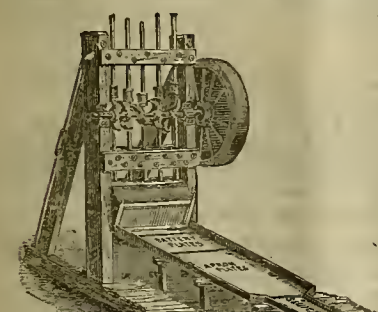
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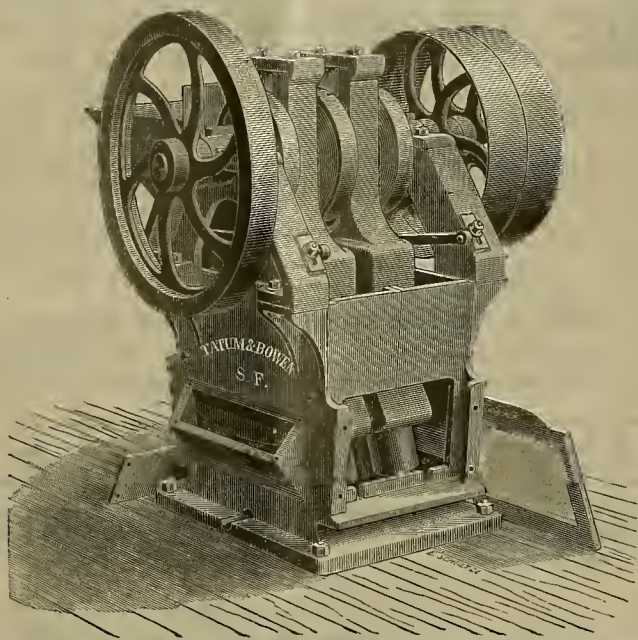
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We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the rapidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in any other mill to do the same amount of work.

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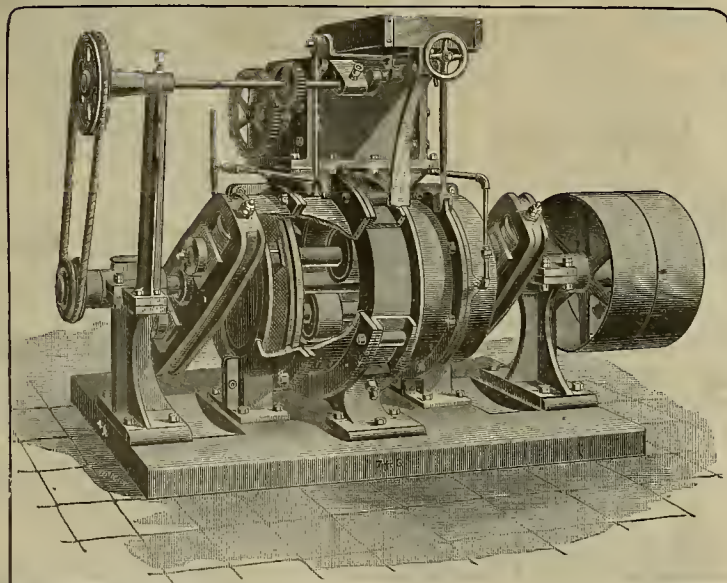
Goes with each Mill. We also have a suitable

Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to supersede the old stamp in mills of the largest capacity.

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This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



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And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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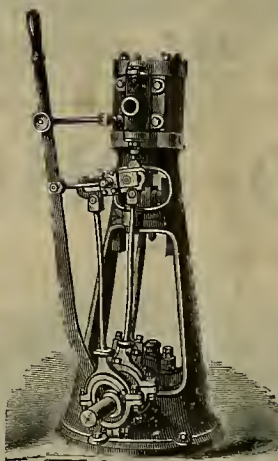
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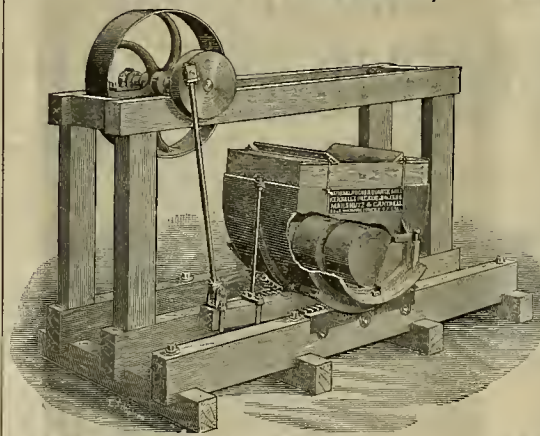
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(With special reference to the Russell process),

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 8, 1888.

VOLUME LVI
Number 10.

"Westward the Star of Empire Takes its Way,"

That is to say, it did so until having reached this Pacific Shore; it has here been arrested. Forty years ago, guided by that auspicious "Star," there was pouring into this California such an immigration as had not before occurred in the history of our planet, whether reference be had to the magnitude of the movement or the consequences that grew out of it. And yet, how different the character of the people now arriving in this State and how different the motives that have prompted them to come here. The men who so poured into California these four decades ago, came as mere adventurers—came not to stay but simply for the purpose of securing a portion of her then only known form of wealth and hastening away.

Not intending to abide in California, these Argonauts were indifferent of her good name, and careless of her interests, as why should they not have been, considering the low estimation in which the country was held of all mankind. What to them could be the future of a land so embosomed with mountains, so scarred with deserts, and largely covered with arid plains?—a land occupied by wild Indians, ease-loving Spaniards, and half-breed whites. There could be but little here to attract or to satisfy the American, accustomed to different scenes and a different civilization, their hearts being all the while in their old homes. Not at all strange then that the pioneers on these shores should have betaken themselves to the business that brought them here, pursuing it with an eagerness and an energy that permitted little else to interfere with its successful prosecution.

That there were among these early adventurers many rough men may be conceded, for theirs was a rough life and rough calling. Nevertheless, they did their work well and in many things even planned well for those who were to come after them. They founded liberal institutions, adopted a broad public policy and preserved the soil of California to freedom, besides constructing many improvements of a highly useful and costly kind.

Not only so, but the "star of empire" having panned in its westward movement, they turned the tide of "empire" backward. Restless and enterprising, these brave and hardy men directing their footsteps toward the East, went forth and peopled the wild regions lying off that

way, and thus California became a founder of colonies even in her youth. She can point to her colonies if not to her colonial possessions planted far beyond her own borders. And so has the settlement of the great interior been hastened by an emigration from the west.

According thus much of praise to these pioneers, let us see what of superior merit can be claimed for this latter-day immigration, the members of which come not here to plunder California and then leave with their gettings, but to make here their homes and enrich her by

An Improved Mining Hoist.

We give on this page an engraving of a standard type of hoisting engines designed and manufactured in this city by Hinckley, Spiers & Hayes of the Fulton Iron Works. The hoist has double cylinders, double reels, and operates with single-tooth gears, and is adapted for deep mining. These engines are 12x16. A special feature is their simplicity of construction and their strength. The working parts are on top so that they are easy to get at in case repairs

Work at the Mining Bureau.

As remarked by us last week, the State Mining Bureau is just now the scene of much activity and hard work. As the institution expands the labor of the superintendent and his assistants necessarily grows space. But the present is with the Bureau an especially busy season. Secretary Durden, what with his duties of cashier and curator of the museum and mineralogical collection, has his hands full, doing, as he always has done, the work of two

men. Not only so, but there has lately been superimposed on these the further duty of classifying and putting in place on the new gallery prepared for their reception the mineral specimens, curiosities, etc., that have accumulated to a perplexing extent.

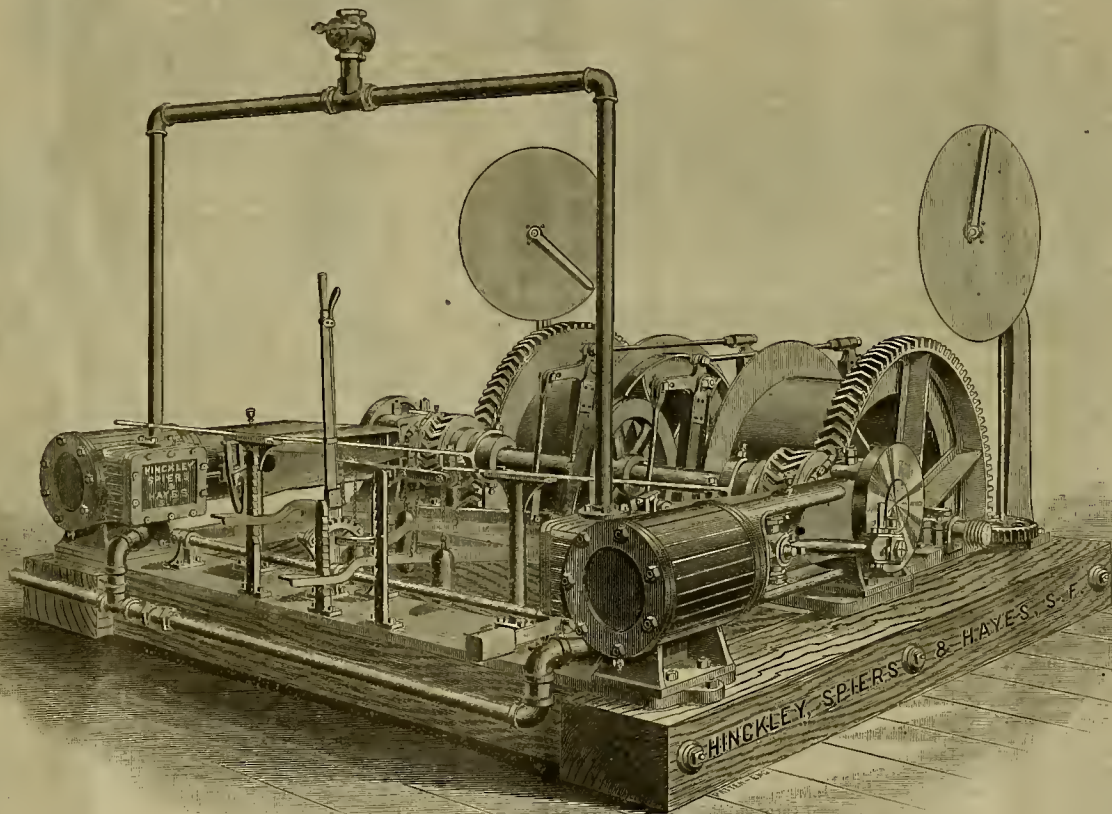
Prof. Snyder, the assistant mineralogist, is also kept busy examining the ores, fossils and other products of the mineral kingdom submitted to him for determination. In associating with him for this purpose one so capable and experienced, Mr. Ireland has shown unmistakable good judgment. It is said that his assistant in referring a mineral has never, during many years of practice, been found in error.

Then, too, the resident trustees, one and all, are giving to the interests and affairs of the Bureau much personal attention.

The regular meetings are fully attended, and no day passes but some of these officials are present counseling or otherwise aiding those having more immediate charge of the institution.

But it is on Superintendent Ireland himself that the burden of the labor as well as the responsibility falls. His duties, always manifold and onerous, are just now greatly increased by the large amount of preliminary work involved in the preparation of his annual report, a document likely to be much more voluminous than any of its predecessors. For some weeks past the manuscript notes collected by his numerous assistants in the field have been coming in at a rate that would have appalled a less resolute and industrious worker. Of this manuscript there will be a thousand pages or more, all of which will require to be examined and revised before being sent to the public printer. On this pleasant work Mr. Ireland is now engaged.

That he will succeed in putting these data so industriously collected and generally reliable in proper shape, producing finally a report alike creditable to himself and useful to the public, we verily believe.



IMPROVED MINING HOIST MANUFACTURED BY THE FULTON IRON WORKS.

contributions of their wealth and labor. That they contrast favorably with the Argonauts, at least in this particular, cannot be denied. That they will in most other respects make equally good citizens is highly probable. The most of these new-comers are people of means, are well educated and largely American by birth, possessing also other qualifications calculated to render them a valuable acquisition to the population of the State. Appreciating their many virtues and the much that has been accomplished by the pioneers, we welcome these later arrivals as a desirable addition to those who came before.

An Eastern mining company has just completed a new 10 stamp mill at Old Oreana, on the Humboldt river. The company's mines are located in Trinity district, about eight miles from the river. The ore carries gold and silver and is free from base metals.

A WIDE RANGE.—At Fort Benton, Montana, the records of the signal service show a range of 170 degrees in one year. Two years ago last summer, it was 110 degrees, and the following winter 60 degrees below,

may be necessary. One of these hoists is now in use at the Ilex mine, in Calaveras county, and another at the New London mine, Amador county. This hoisting plant is provided with indicators, etc.

MINING ACCIDENTS.—On the 30th ult. John Henager while drilling in the Palouse country lost an eye by a piece of steel from the drill flying off and striking it. August 23d John Oberton had his arm broken and badly cut and his right hand mashed to a pulp by a rock falling on it in the Union mine at Copperopolis, California. On the 27th ult. James McKinnon and John Murphy were caved on in the Alta mine, near Gold Hill, Nevada, and sustained very severe injuries.

THE experiments made by the Union Electric Co. at Lykens coal mine, Pennsylvania, have proved a success beyond all doubt. The loaded and empty coal-cars in the mines are now propelled by electric motor instead of the old-time mule or steam locomotive.

A KILN of 300,000 brick has been fired at Tuscarora, Nevada.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

2. *Reasons for Adding all the Hyposulphite to the Extra Instead of the Ordinary Solution.*—The first reason is that, in treating raw ores, the extra solution is nearly always used first. As it is not preceded by any wash-water, but is used on dry ore, no loss of chemicals occurs at this part of the leaching.

Secondly, in treating "simple alkaline" roasted ore, the extraction of a large part of the silver must be done by hyposulphite of soda or lime in the presence of cuprous hyposulphite. But when bluestone is added to a hyposulphite solution, it absorbs twice its weight of hyposulphite of soda or lime into the cuprous hyposulphite. So, if only that amount of hyposulphite were present, it would all be absorbed in this way, and the extra solution would fail in this, the most important of its two uses, on simple alkaline ore. The work of the extra, in the use of it here recommended, is more quickly done and at less expense of bluestone, in proportion (within certain limits) to the strength of the solution in hyposulphite.

Thirdly, when the metals are precipitated from the extra solution, it becomes converted into ordinary hyposulphite solution, so that the addition of hyposulphite to the extra is, in all cases, eventually the same as adding it to the ordinary.

Fourthly, as the extra solution, at the time of making it, must have twice as much hyposulphite as the bluestone added to it, it is found much more economical to add to this small volume of extra solution sufficient hyposulphite to raise it to the proper strength (say 1.75 per cent) than to maintain the whole volume of stock solution at that strength.

3. *Strength and Preparation of the Extra Solutions Raw, Acid Roasted and for Alkaline Arsenical Roasted Ores.*—The strength of the extra solutions used on the above ores varies from 0.7 to 1.1 per cent in bluestone, and from 1.5 to 2.3 per cent in hyposulphite. This percentage of hyposulphite is the percentage existing in the stock solution at the time of making the extra, plus that added with the bluestone.

The reason why the extra solution for roasted ores can be made up on the charge of ore is that it is prevented from sinking into the charge during its preparation by the solution already in the charge, which stands level with the surface of the ore—the outlet of the leaching-tank being stopped while the extra solution is being prepared. But, in the treatment of raw ores, the extra solution is generally used on dry ore, which would absorb the extra solution during the preparation of it, and thus prevent the obtaining of a homogeneous solution.

4. *Strength and Preparation of the Extra Solution for Simple Alkaline Roasted Ore.*—No rule can be laid down for the preparation of these extra solutions, as the volume required may vary from four to six times the amount required to saturate, and the strength from 0.1 to 0.33 per cent in bluestone. Besides, for some ores of this class, all or a portion of the bluestone may be used, as at Lake Valley, in the first wash-water.

5. *Amount of Chemicals Required, and Efficiency of the Extra Solution in the Extraction of Silver.*—Table XVIII gives the amount of chemicals required for strong, medium and weak extra solutions, the amount of hyposulphite given in the table varying not only as the amount of bluestone used, but also as the strength of the stock solution. The table is for Cusi roasted ore, which has an acid reaction, weighs about 70 lbs. per cubic foot, requires 11 to 12 cubic feet to saturate it, and is treated in charges of about 9 tons. Of course an ore, requiring only 7 to 10 cubic feet to saturate it, would require less chemicals for the various strengths of stock solution.

A noticeable fact is the difference in amount of bluestone and hyposulphite required in the treatment of simple alkaline roasted ore, as compared with acid-roasted ore. In Table XIV, the six acid roasted ores require an average of 6.1 lbs. bluestone and 4.9 lbs. hyposulphite, while the four simple alkaline ores (Sierra Grande, San Miguel, Veta Grande and Daly) require only 4.5 lbs. of bluestone and 2.9 lbs. of hyposulphite.

The average maximum extracting-power in silver per ton of ore of a single medium or strong extra solution in Table XVIII, containing 6½ to 8 lbs. of bluestone per ton of ore, is 12.2 oz. per ton. This was determined in 21 experiments at Cusi on San Antonio and San Bartolo ore. For these tests charges were selected, having tailings of 20 to 40 ozs. per ton after the ordinary solution had done its utmost work and had failed to lower the value of the tailings further. The extra solution was then used on these charges—sometimes the strong and sometimes the medium of those described in Table XVIII. Of course, on charges yielding tailings of 30 to 40 ozs. per ton by the ordinary solution several extra solutions had to be used to reduce these tailings to 6 or 8 ozs. per ton. The results showed that the use of 6½ to 8 lbs. bluestone per ton increased the average mill-extraction by 12.2 ozs. per ton of ore, which is equivalent to 1.68 trounce ounces of silver for each avoirdupois pound of bluestone. At the Ontario, the additional extraction caused by the use of two charges of extra solution of 9½ lbs. each was an extraction of 39.1 per cent of 88-ounce ore, more than could be

extracted by the ordinary solution in either the mill or the assay-office. This is an additional extraction of 34.4 ounces per ton or 17.2 ounces for each extra solution with 9½ pounds bluestone, or an extraction of 1.81 ounces of silver per pound of bluestone. Both the Cusi and Ontario were acid-roasted ores.

TABLE XVIII.

TABLE OF CHEMICALS REQUIRED FOR EXTRA SOLUTIONS OF VARIOUS STRENGTHS FOR CUSI ROASTED ORE; WEIGHTS OF CHEMICALS PER TON AND PER CHARGE OF NINETEENS.

Strength of Extra Solution (per cent)	Bluestone per charge (lbs.)	Hypoculphite per charge (lbs.)	For a Stock Solution Containing 10 of One Per Cent Hypo.	For a Stock Solution Containing 10 of One Per Cent Hypo.	For a Stock Solution Containing 1 Per Cent Hypo.	For a Stock Solution Containing 12 Per Cent Hypo.
0.1	1.1	1.5	1	1	1	1
0.2	2.2	3.0	2	2	2	2
0.3	3.3	4.5	3	3	3	3
0.4	4.4	6.0	4	4	4	4
0.5	5.5	7.5	5	5	5	5
0.6	6.6	9.0	6	6	6	6
0.7	7.7	10.5	7	7	7	7
0.8	8.8	12.0	8	8	8	8
0.9	9.9	13.5	9	9	9	9
1.0	11.0	15.0	10	10	10	10
1.1	12.1	16.5	11	11	11	11
1.2	13.2	18.0	12	12	12	12
1.3	14.3	19.5	13	13	13	13
1.4	15.4	21.0	14	14	14	14
1.5	16.5	22.5	15	15	15	15
1.6	17.6	24.0	16	16	16	16
1.7	18.7	25.5	17	17	17	17
1.8	19.8	27.0	18	18	18	18
1.9	20.9	28.5	19	19	19	19
2.0	22.0	30.0	20	20	20	20
2.1	23.1	31.5	21	21	21	21
2.2	24.2	33.0	22	22	22	22
2.3	25.3	34.5	23	23	23	23
2.4	26.4	36.0	24	24	24	24
2.5	27.5	37.5	25	25	25	25
2.6	28.6	39.0	26	26	26	26
2.7	29.7	40.5	27	27	27	27
2.8	30.8	42.0	28	28	28	28
2.9	31.9	43.5	29	29	29	29
3.0	33.0	45.0	30	30	30	30

Only for a roasted ore which requires 12 cubic feet to saturate.
For cost of these various extra solutions see Table XXIV.

At the Ontario, when allowed to act on tailings from the ordinary solution, but very high in value, or in other words when allowed to show its utmost efficiency, the amount of silver extracted by the extra solution was in value about 15 times its entire cost, including chemicals, preparation and application, and the precipitation of the metals from it. When used on simple alkaline roasted ore, the extra solution may have a still greater efficiency in extracting silver, due to its double action hereafter referred to.

6. *General Rules to be Observed in the Preparation and Use of the Extra Solution.*—If the extra solution is made at a temperature of over 120°, it should not be prepared until just before using. Even cold extra solutions should not be allowed to sit and unused more than six or seven hours. For all ores except the simple alkaline roasted ores, the total weight of hyposulphite used, including that existing in the stock solution, should be at least twice the weight of bluestone. For simple alkaline roasted ore, the weight of hyposulphite used, including that existing in the stock solution, should be at least three times that of the bluestone.

As already stated, the extra solution is made up either in a separate tank or on the surface of the charge. The first method is always used for raw ores, and for roasted ores also if the leaching works are to be run to their utmost capacity. In this method about one-third of the total volume of solution required for the extra solution is run into the storage-tank in which the extra is to be prepared. The proper quantity of chemicals is then placed in the chemical box, and the remaining two-thirds of the stock solution allowed to run in through this box. If this is not sufficient to dissolve all the chemicals, some of the extra solution in the tank is circulated through the box by means of a No. 4 siphon pump until they are dissolved. The reason for running one-third of the stock solution into the tank before dissolving the chemicals is to avoid the formation of the yellow precipitate (cuprous hyposulphite) at the bottom of the tank, which would be dissolved only after considerable stirring. In any case, however, the extra solution is stirred just before it is used. In making up the extra solution on the surface of the ore, for all except simple alkaline ores, the chemicals are placed in the chemical box and the whole volume of stock solution required allowed to pass through them. The extra solution is stirred just before it is used, and whatever yellow precipitate may be left on the ore will be dissolved during the circulation. But in making up the extra solution for simple alkaline ores, none of this precipitate forms, since it does not appear if, as in the treatment of them, the amount of bluestone is considerably less than one-half the amount of hyposulphite. In making up the extra solution for these ores, the manipulation is the same, except that four to six extras are made up, each containing much less chemicals, which are not circulated, and which are applied directly after the first wash-water, instead of after the ordinary or stock solution, and cold instead of warm. Practical experience has demonstrated that if roasted ores containing an appreciable percentage of caustic lime are treated with ordinary solutions after the first wash-water, as must be done if the old process of leaching is used, the result may be very disastrous, and that the damage done

is only partially made good by the subsequent leaching with the extra solution. But if the extra solution is applied at once, the cuprous hyposulphite neutralizes and counteracts the deleterious effect of the caustic lime, and leaves the silver in a soluble form. Before the extra solution follows the first wash-water, it has been found beneficial to impregnate the ore with a small quantity of a strong copper sulphate solution. It can easily be seen that the first portion of the extra solution, replacing the wash-water, must become more or less diluted by contact with water. This dilution may be so considerable that an insufficient quantity of copper is present to protect the silver from the deleterious influence of the caustic lime. Therefore, after the leaching with water is finished, and just before the extra solution is to be used, about one or two pounds of bluestone per ton of ore is dissolved in an amount of water equal to from one to three inches on the surface of the ore. As soon as this sinks to the surface of the ore, the extra solution is used. But for some ores all the bluestone may be used in the first wash-water. This may be done when the ore contains such a compound (usually carbonate of an alkali or alkali earth) as will precipitate all or a portion of the copper out of the wash-water, in the ore, in such a state that it will be wholly or partially dissolved by the ordinary or stock solution afterward used, thus making the extra solution in the ore. The bluestone, when thus used, is added to about one charge (or volume to saturate) of wash-water, which may be either passed through the charge only once or circulated. If desirable, it may be followed by more wash-water, in order to wash out any copper not precipitated in the ore.

c. Differences Between the Solutions.

1. *Difference Between the Ordinary and the Extra Solution and Between the Extra Solutions.*—No extra solutions are kept in stock; they are made up fresh for each charge. The extra solution for simple alkaline ores is used like the ordinary, i. e., without circulating, but differs from it, it containing a fraction of one per cent of cuprous hyposulphite, and in losing its efficiency as an extra when precipitated. For all other ores, both raw and roasted, the extra solution differs from the ordinary in containing from six-tenths of one per cent to 1.2 per cent of cuprous hyposulphite, in being much less in volume, and in being circulated, and also in losing its efficiency as an extra when precipitated.

The extra solutions differ from each other as follows: For simple alkaline roasted ore, the extra is used cold, weak, in comparatively large volume, is not circulated, and is used immediately after the first wash-water; or part or all the bluestone may be used in the first wash-water. For all other ores, both raw and roasted, the extra solution is generally used stronger, warm, as small in volume as possible, after the ordinary solution, is circulated, is followed by hot ordinary, and no bluestone is used in the first wash-water.

2. *Reasons for the above Differences.*—In the treatment of simple alkaline roasted ore, the extra solution has a double use. First, in dissolving and extracting the silver and gold compounds not soluble in the ordinary solution, and, secondly, in protecting the silver (and gold) from the injurious effect of the caustic alkali in the ore, while they are being dissolved by the hyposulphite and are passing out of the charge. The first is the regular use of the extra solution, but in its second use it is of much more value. In this use of the extra, the extraction of that part of the silver soluble in hyposulphite only is done under the protection, so to speak, of the weak extra solution. Hence the bluestone must be used at the beginning, and its use continued until, as shown by experience, three to six charges of solution have been used. Its use is then no longer necessary. It should be remembered that a "charge of solution" is an amount of solution equal to the amount required to saturate the "charge of ore."

3. *Reasons for Circulating and for Small Volume of Extra.*—For those ores on which the extra is circulated, it must be of a certain strength, say 0.6 per cent, to accomplish its object. Therefore, the smaller the volume of extra per ton, the less will be the cost of chemicals per ton. The reasons for circulating the extra but not the ordinary, are two: In the first place, the ordinary solution, in passing through the precipitating-tanks, renews its strength as an ordinary, and is ready to be used again. There is, therefore, no reason why it should be circulated before being precipitated. The extra solution, on the contrary, in passing through the precipitating-tanks, loses its efficiency as an extra, being converted into ordinary solution. Therefore, the whole effect of the extra should be obtained before allowing it to be precipitated, which can only be done by circulating it. In the second place, the volume of the extra is the smallest possible that will saturate the ore, and, on this account, in passing through the charge only once, all particles of the ore might not be brought in contact with it. On the other hand, the volume of the ordinary solution is practically unlimited, the storage-tanks being always kept supplied from the precipitating-tanks at no additional cost for chemicals.

d. *Manipulation of the Extra and Special Extra Solutions.*—When the extra solution is to be circulated, the outlet leading to the precipitating-tanks is stopped when the surface of the extra solution has sunk to one-half inch above the surface of the ore. Steam is then turned into the siphon pump, and the solution returned

on to the surface of the ore continuously from four to six hours. For simple alkaline roasted ore the extra is allowed to pass through the ore as if it were the ordinary.

The extra solution for raw and for acid-roasted ore should be followed by hot ordinary. Also, in the treatment of simple alkaline ores, all the bluestone may sometimes be used in the first wash-water by adding two to four pounds of bluestone per ton of ore to about one-half or two-thirds of a charge of wash-water, after the washing is about finished, and allowing it to pass through the ore like the rest of the wash-water. It may sometimes be followed by more wash-water; but usually it immediately precedes the ordinary. In the treatment of alkaline arsenical ores, ordinary solution is used before the extra, until nearly all the silver has been extracted which is soluble in the ordinary solution. The extra solution is then used, being always allowed to stand from 6 to 12 hours in the charge, although it may then be circulated. It may be used cold or hot, but is always followed by hot ordinary, when used cold. The formation of a yellow precipitate, during the preparation of the extra solution, which fails to dissolve by the time the extra is ready for use, indicates an insufficient amount of hyposulphite.

Acid ores and simple alkaline ores (according to experience so far) should not be mixed in the same charge. In case such a mixture should occur, the charge should be treated first as if it were alkaline ore, and then as if it were acid.

TABLE XIX.

ORDERS IN WHICH THE LEACHING-SOLUTIONS MAY BE APPLIED IN THE TREATMENT OF RAW AND ROASTED ORES.

Order	Strength of Extra Solution (per cent)	Bluestone per charge (lbs.)	Hypoculphite per charge (lbs.)	For a Stock Solution Containing 10 of One Per Cent Hypo.	For a Stock Solution Containing 10 of One Per Cent Hypo.	For a Stock Solution Containing 1 Per Cent Hypo.	For a Stock Solution Containing 12 Per Cent Hypo.
1	0.1	1.1	1.5	1	1	1	1
2	0.2	2.2	3.0	2	2	2	2
3	0.3	3.3	4.5	3	3	3	3
4	0.4	4.4	6.0	4	4	4	4
5	0.5	5.5	7.5	5	5	5	5
6	0.6	6.6	9.0	6	6	6	6
7	0.7	7.7	10.5	7	7	7	7
8	0.8	8.8	12.0	8	8	8	8
9	0.9	9.9	13.5	9	9	9	9
10	1.0	11.0	15.0	10	10	10	10
11	1.1	12.1	16.5	11	11	11	11
12	1.2	13.2	18.0	12	12	12	12
13	1.3	14.3	19.5	13	13	13	13
14	1.4	15.4	21.0	14	14	14	14
15	1.5	16.5	22.5	15	15	15	15
16	1.6	17.6	24.0	16	16	16	16
17	1.7	18.7	25.5	17	17	17	17
18	1.8	19.8	27.0	18	18	18	18
19	1.9	20.9	28.5	19	19	19	19
20	2.0	22.0	30.0	20	20	20	20
21	2.1	23.1	31.5	21	21	21	21
22	2.2	24.2	33.0	22	22	22	22
23	2.3	25.3	34.5	23	23	23	23
24	2.4	26.4	36.0	24	24	24	24
25	2.5	27.5	37.5	25	25	25	25
26	2.6	28.6	39.0	26	26	26	26
27	2.7	29.7	40.5	27	27	27	27
28	2.8	30.8	42.0	28	28	28	28
29	2.9	31.9	43.5	29	29	29	29
30	3.0	33.0	45.0	30	30	30	30

The special extra solution is merely an extra solution which has already been used upon one charge. When used upon a second charge, it is always applied immediately before the regular extra. The main object in using it is, that the regular extra solution may be diluted by a solution of its own kind, as it is sure to become diluted to some extent with whatever solution is in the charge. Another reason is, that the efficiency of an extra solution is not usually exhausted by using it on one charge. Its use saves chemicals and causes a higher extraction

of the silver, and, for the same amount of blue-stones per ton, the product is of a higher grade if the extra solution is used as a "special extra."

Also the use of the "special extra" secures a more even extraction of the silver from all parts of the charge of ore. For instance, at Cusi, on San Bartolo ore, the tailings from the lowest six inches of the tub averaged 7.0 ozs. On the other hand, while using the special extra, similar samples averaged 5.3 ozs.

It may be used on any ore, in the treatment of which the extra solution would follow the ordinary. It is not circulated, but precedes the extra as if it were ordinary solution, and passes from the charge on which it has been used directly to the precipitating-tanks.

(To be Continued.)

The Remarkable Colliery in Japan.

Among the many new private enterprises in Japan, the most remarkable is unquestionably the Takashima colliery, which takes its name from the rocky island on which it stands. In its early days, and these are but 20 years ago, it was a petty affair, producing a few hundred tons annually for the use of Japanese salt manufacturers, and occasionally steamers. Now its yearly output is about 500,000 tons—the sales last March amounted to \$50,000—and its vicinity to Nagasaki has the effect of bring-

Englishmen and Petroleum.

Englishmen are at length compelled to acknowledge that they have been mistaken about the petroleum situation and what it presaged. It has taken considerable time to get their eyes open, and the awakening has not been alarming, but it has been astonishing. So secure they felt in the appearances of Russian competition with Pennsylvania refined that the idea of any material advance in the price was regarded as out of the question. They find to be true what the *Derrick* stated several months ago to be probable, that the Russians are not likely to sell oil at 5d. when they can get 6d. for it. They have discovered that Americans can treat the so-called Russian competition with just such consideration as it deserves, irrespective of the magnifying power of the British press. The days of humbug in trade with the United States are fast passing away. This country has outgrown the condition of such people as those with whom England has been accustomed to trade outside of Europe. The means of obtaining full and accurate information concerning the affairs of the world are rapidly approaching their own, and when pitted directly against each other with equal facilities for information, we have yet to learn that American intelligence or ability in trade is inferior to that of any nation. The petroleum situation is becoming stronger from a variety of causes over which America has no control, but

Improved Ten-Inch Four-Sided Molder.

The machine here illustrated is adapted for doing the heaviest as well as the finest grades of work. The frame, cast in one piece, is massive, and as rigid and steady as an inside molder, while it has every convenience for quick changes, all the parts being easily accessible. It has a solid outside bearing for the outer end of top center head shaft.

It has four feed-rolls, six inches diameter, two above and two below; all are geared, the upper and lower being independent of each other. The gearing which drives the lower rolls is not affected by lowering the table to the full capacity of the machine. The feed-works are started and stopped with a binder.

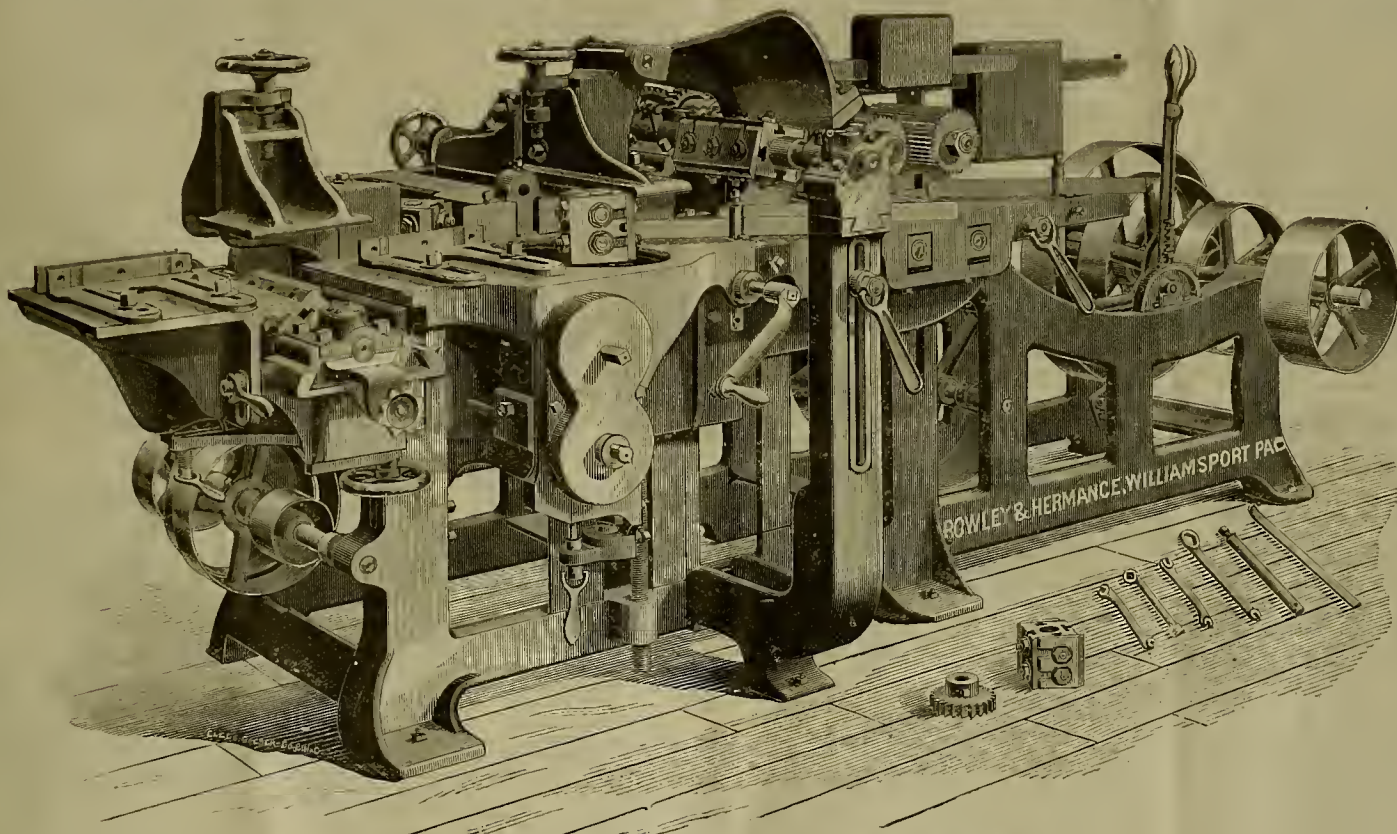
The boxes supporting the main arbor are so arranged that the wear caused by the belt forcing the arbor toward the countershaft is confined to the bottom of the box so that the wear can be readily taken out by tightening the caps.

The bottom and both side beads are adjustable horizontally and vertically. By means of a screw the spindle carrying the outside head can be set at any angle, and the head may then be moved out or in without changing the angle.

The table, which is raised and lowered by an ingenious device, is provided with adjustable chip-breakers on both sides of the bottom head. It also has an adjustable chip-breaker for the inside head. It will dress ten inches wide by

CUTTING GLASS BY ELECTRICITY.—Several of the South Side glass factories are now using electricity for cutting glass. Heretofore when they wanted to cut one of the large cylinders of window-glass, a simple but primitive method was used. This consisted of the pulling out from the furnace of a thin shroud of glass heated white. This was quickly wrapped around the bottle-shaped end of the cylinder, and it burned through or fractured the glass. A pair of tongs had to be used in the process. By the new method the glass cylinder is encircled with a fine wire, the extremities of which are put in connection with a small electric battery. It is necessary that the wire adhere closely to the glass. When a current of electricity is passed through the wire it becomes red-hot and heats the glass beneath it. Then a single drop of water deposited on the heated place will cause a clean breakage of the glass clean around in the path of the wire. Contrary to what takes place with the usual process in the treatment of this fragile material, it is found that the thicker the sides of the cylinder the better the cut.—*Ec.*

ASPHALT PAVING.—A St. Paul gentleman writing from Paris recently says: "My observation of pavements in this city during wet and dry weather confirms me in the belief that, all points considered, asphalt is the kind to be first chosen for all the great driving streets, of course, not for those subjected to heavy business traffic. Paris led in the asphalt innovation on the ground of homogeneity of material, noise-



EXTRA HEAVY IMPROVED TEN-INCH FOUR-SIDED MOLDER

ing to that port a large number of vessels, some to obtain supplies of fuel for themselves, others to carry the mineral thence to Shanghai, Hong-Kong and Singapore. It seems that a certain Mr. Fuka Keikichi, who is treated as the agent of people recently dismissed from the colliery, has been "raving of the mine as though it were an inferno of misers and suffering," and "lamenting over the work people as though among God's creatures none were so wretched and forlorn," and as a consequence the Japan Mail proceeds to give a quiet and comforting, though deeply interesting, account of the great Japanese colliery. But first the writer affords a glimpse of an extraordinary feature of the colliery work at the port of Nagasaki, a few miles distant from the mine. Not less than 5000 women are kept upon the staff of the enterprise, for the purpose of filling the bunkers of vessels there arriving. The method pursued is peculiar to Nagasaki. Lighters carrying the coal come alongside the ship to be supplied, and with each of them is a regiment of women and girls. These form themselves into a loop of a chain, connecting the hold of the lighter with the deck of the steamer. In a moment the hands and arms of this chain begin to move with surprising rapidity and the precision of long practice, and little bags full of coal pass one side of the loop and the same bags descend the other side empty. There is not a second's delay. The business goes on with lightning-like nimbleness, amid the laughter and chatter of the cheerful workers. The results achieved are most remarkable. Under favorable circumstances as to receiving capacity, a vessel can have 400 tons of coal put into her bunkers in an hour, and the neatness of the process is scarcely inferior to its celerity. Such an organization would scarcely be possible outside Japan.

the tide is setting our way. The oil-wells of Gallacia are producing much less oil than formerly, and are believed to be failing entirely. Russian production is not so great as it was. The head has been blown off their territory and the production went largely to waste, the outlay of millions of pounds sterling in the various lands trying to get a truly competitive article with Pennsylvania oil has brought no return to the investment. The Egyptian boom is dead, Burmah is not remunerative. Oriental countries, as well as Europe, have found, despite false brands in imitation of the American product, that Russian oil is inferior to American; that it is watery; that it smokes, cracks chimneys, and the people in those places where cheapness drove out American oil, clamor for the oil they "used to get." The world is fast finding out that mere cheapness in price is not always economy in oil more than in anything else. This is the principal cause for hopefulness in the present situation; the reason why American refiners can look upon Russian competition with what our English cousins see fit to call indifference. The day is dawning when all oil will not be considered to be in competition with Pennsylvania oil more than all flour can be considered to be in competition with wheat-flour. The black, tarry, bituminous stuff elsewhere obtained will be relegated to its proper uses and prices, and may be used on occasion as a substitute, when necessary to prevent extortion, but never as a competitor.—*Derrick.*

SUNFLOWERS are used in Wyoming Territory for fuel. The stalks, when dry, are as hard as maple wood, and make a hot fire, and the seed-heads with the seed in are said to burn better than the best hard coal. An acre of sunflowers will furnish fuel for one stove for a year,

four inches thick on four sides, and the table will lower 12 inches.

Each machine is furnished with five heads and five sets of plain cutters and one extra spur feed; also with necessary wrenches.

The tight and loose pulleys are 12-inch diameter by 7-inch face, and should run 850 revolutions per minute.

ALASKA FUR COMPANY.—Asa Williams of New London, Connecticut, who has been engaged in the shipping industry for many years, and is a member of the Alaskan Fur Seal Co., was the first witness before the House Committee on Merchant Marine and Fisheries. Williams gave a history of the seal fisheries from the time the industry began in the southern seas. As early as 1799, he said, Russia leased the privilege of taking seals. It didn't pay, and this led to ceding the islands of St. Paul and St. George to the United States. After the seal islands cession to the United States, witness said he had a ship fitted out and sent to the seal islands. Four or five other firms did the same thing, and there were taken that year probably over 150,000 skins. The tendency of this was to destroy the industry. Perceiving this was the case, witness came to Washington and urged the enactment of the present law, limiting the number of seals to be taken, setting apart these islands as a seal reservation and letting out the privilege. The stock in the Alaskan Company is held by citizens of the United States. The capital stock of the company is \$200,000. The contract only extends to the two small islands of St. George and St. Paul, and no other part of Alaska. The company, however, carried on operations in other parts of Alaska just the same as other companies were privileged to do,

lessness, perfect surface drainage and the ease with which the streets can be repaired. The asphalt is a charming pavement. The smoothness is exhilarating to the driver. He feels like driving to the portals of the day if he could. There is asphalt and asphalt. Some of it is good; some of it is bad, and there are base imitations of it in crude mineral tar or manufactured tar mixed with pulverized minerals of earth. In all good asphalt pavements the asphaltum rock is heated to 200° or 212°; is compressed while hot and when cool assumes all the essential qualities of the original rock. The Summit-avenue pavement is a fine one. In the city of Berlin asphalt pavements are in high favor. About 500,000 square meters of the pavement are in use there now, and much more is ordered this year at 17 marks 50 pfennigs the square meter—\$4.75. Asphalt is well adapted to the Minnesota climate. The prophete of evil have been disappointed."

QUANTITY OF SALT IMPORTED.—The quantity of salt imported into the United States during the fiscal year ended June 30 1888, was 690,346,246 pounds, worth \$1,156,962 against 778,336,362 pounds, worth \$1,438,031, imported during the preceding fiscal year. The duty paid on the quantity of salt imported last year was about \$8,000,000. This went into the United States Treasury, and relieved the American people of the payment of this sum. If salt were on the free list, as proposed in the Mills bill, it would go into the pockets of the foreign producers.

DEADLY BOMBS IN SCRAP HEAPS.—Seventeen deadly bombs of the anarchist pattern were found in the scrap-iron pile of the Swift Iron & Steel Works, near Cincinnati, where it had been gathered from various sources.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—The thermometer has marked over 100 every day the past week. Sinking at the North Star mine is completed, having reached a depth of 650 feet. Drifting has been commenced at the 600 level, running east. In all probability they will not drift far until there will be another drift started west, and both will be run for a considerable distance before they will be abandoned. Everything is going on favorably at the Wildman mine. The first 100 feet sinking will be finished in another week, when they will cut a station and explore the ledge, which from present appearances is very good, and the mill will be likely to run day and night. However, sinking will be continued probably for 200 or 300 feet before they will stop.

PLYMOUTH.—*Ledger*, Sept. 1: The past week has been the dullest week that we have had in Plymouth since the mine closed down, everything seemingly dead and ready to be buried. It will, however, be opened up within a week or less. The very warm weather of the past few days has reduced the water so that there is not more than 25 inches running in the creek, and we hear that water is very low in the river.

Calaveras.

ANGELS CAMP.—*Mountain Echo*, Sept. 1: The new hoisting works of the Ulica mine loom up nearly 100 feet. When completed these will be the highest hoisting works in the State. The Nevills has the deepest shaft in Angels, being over 400 feet. Work in this mine is progressing under favorable circumstances, and the lead in sight is full of gold. The town is full of strangers every day, and business is quite brisk.

El Dorado.

ON THE DIVIDE.—*Georgetown Gazette*, Sept. 1: No part of California has yielded so much gold with so little outlay as the Georgetown divide. Its location in relation to the great Sierras shows that it is in the line of the upheaval which caused them. The Taylor, Rosecrans, Bright Hope, Alpine and other mines are exactly in the trend of the mineral belt, and no doubt received their deposits of ore among the very first of the fissures. The Taylor, Alpine, Josephine, Gopher-Boulder, Dalmatia and Zantgraft are the only vein mines that are worked, and of these all are idle except the Alpine and Taylor. The trouble is not lack of ore, but lack of water to work the stamps and flood the batteries. Of the hundreds of seam mines that are on the divide, many of which are known to be valuable, and some of which are owned by the California Water Company, only the Blue Rock, Beatty and Pacific are working. Of the drift mines, on the north side of the divide, only two—the Buckeye Point and the Cooley—have men at work on them, and they are only developing. The Mount Hope mine, owned by the California Water Co., and lying, according to the opinions of the ablest judges and most experienced miners, exactly in the channel of the old river, is idle. The Fairchild and the Boulder, hydraulic mines, are idle too, although they are known to be rich properties. In every case the trouble is scarcity of water. We have no hesitation in saying that if the supply of water that could be used were at the disposal of the local company, where it is wanted, in less than two years 500 stamps would be dropping, hundreds of seam and drift mines would be at work, every bar on the Middle Fork of the American river would be a hive of industry, good properties like the Bright Hope and O. K. would be developed, prospectors would cover the hills and life, stir and activity would be the order of the day. In the early days the Georgetown divide yielded more than its proportion of the millions California produced. It was all taken from the surface workings, and the wealth they contained was as, to the wealth that lies waiting below, the waves of the ocean to the great mass of water upon which they dance. Once unlocked by means of larger canals, the vast stores of water that lie between the Middle and South Forks of the American river and the Tall's mountain range and the timber belt, and a new and important chapter will have to be added to the history of the gold production of California.

Mariposa.

ABOUT MADERA.—*Mercury*, Sept. 1: The Surprise and Gambetta mines at Grub gulch are turning out rich ore now, from all reports. A new mill is being put up there. New mines spring up daily in the mountains, and the latest is on the summit of the Sierras, about 100 miles east of Fresno, where a New York syndicate has invested \$100,000 recently.

Nevada.

GOOD ORE.—*San Juan Times*, Sept. 1: The Nevada Junction company at Nevada City has tested 200 pounds of the rock from its ledge. Oscar Maltman worked 100 pounds of it and J. J. Ott the remainder. Mr. Maltman obtained from his test \$70.80 in gold and silver, and Mr. Ott figured up \$66.80 as his returns. Judging from results obtained from the 200 pounds, the Junction ore contains 300 pounds of copper to the ton. At the ruling price of this metal, an additional \$66 per ton is to be added to the above figures in determining what the rock will yield when worked for its principal metals. Of course the above figures are reckoned on a too basis.

THE PITTSBURG MINE.—Work has been pushed here with great vigor of late, and the mine shows much improvement. Considerable new ground has been opened up by drifts, and as opportunity offered the working force has been increased until there are now 30 men employed above and below ground, and this force will be increased as sufficient ground is opened to work more men. The mine is now opened to the ninth level, which is nearly 1000 feet on the incline, where a fine looking ledge is exposed, from two to two and one-half feet in size, highly sulphureted, and prospects well in free gold. The company contemplates the building of a new 10-stamp mill to take the place of the old mill, which will have all the latest and best improvements for gold and sulphuret saving, and which will be completed by the first of the new year. Water-power, under pressure, will be used for driving the mill as is now being done for hoisting and pumping. There is an ample water-power at command for all pur-

poses, which is obtained from the South Yuba canal, the pressure being 200 feet. The prospects of this old mine, which was once a good dividend-payer, are considered excellent, and when the new mill is ready the drifts and stopes will be opened up sufficiently to keep it constantly in operation.

Placer.

IOWA HILL.—*Republican*, Sept. 4: The supply of water for mining purposes on the Iowa Hill divide is very limited this year. At the Morning Star they have water only about 20 hours a week, and they are cleaning up from 40 to 50 ounces a week, which is the yield of half an ounce to the carload. The Pioneer mine is developing splendidly, and their new machinery is now on the way from San Francisco. They have struck a big body of ore in the south drift of the 340-foot level of the Pioneer, which Superintendent Lightner reports to be 30 feet wide and worth \$10 a ton. At the Red Point they are short of water, but are driving gangways and preparing to lay 6000 feet of 7-inch pipe to bring water from Humboldt canyon. There is plenty of water in the canyon. Twenty inches are running now, and this is the driest season known for years. When this water is led to the Red Point mine it will be sufficient to run their blower and to wash all the gravel. The gravel from the gangways averages \$5 to the carload and improves as they go east. J. B. Hobson is driving a prospect tunnel with two shifts of men at Indian Springs, above Red Point. He has broken into cement and will soon sink a shaft. The Hogback tunnel is in over 600 feet, and has lately been running through some very hard rock. The first upraise will be made at 1100 feet, which they expect to reach the latter part of October. At the Drummond mine near Cottage Home, Mr. Hobson has sunk a new shaft 500 feet deep just south of the old works, and has developed a new ledge seven feet wide, which goes about \$10 a ton. William Cameron has bought the right of redemption of the Golden Gate mine, formerly the Bowley claim. The price was something over \$3000, and Mr. Cameron will open it as a drift mine. H. Hoorman at Wisconsin Hill is opening up his claim for drifting, and the gravel yields \$4 a car on the dump without crushing. His mine is on the same channel as the Morning Star. J. J. McIntire is pegging away on his prospect tunnel. All the miners say that the Pioneer is the coming quartz mine in the country.

ON THE FOREST HILL DIVIDE.—The old Dardanelles and the Baker Divide Companies having opened their mines and equipped them with first-class plant, are now operating with success. The Paragon mine at Bath is paying richer than ever. A short time ago an extensive cave in the breast occurred, which uncovered richer gravel than had ever before been seen in the mine. According to report, the deposit pays \$20 to the carload, and is equally rich from top to bottom. The Gray Eagle shaft is down 350 feet in chocolate-colored cement, similar to that overlying the pay gravel in other mines in that vicinity. The shaft is deeper than any other shaft in the Spring Garden mining district. The pumps handle four inches of water. Ten men are employed in the Live Oak mine. The necessary number of drifts have been run to open up the mine for systematic working. The indications are that the mine will soon become good paying property. Sixteen men are at work completing the Mayflower tunnel. The work is progressing rapidly, and the time will not be long before the miners will be at work taking out gravel from this wonderfully rich channel. J. C. Scott has begun work on his Volcano Canyon mine. It is reported that William Muir has formed a company to run a big tunnel into the Divide at Michigan Bluff. It is intended to be the working tunnel of all the mines on the divide above Michigan Bluff. The work will be done by electricity.

Shasta.

GENERAL ITEMS.—*Republican Free Press*, Sept. 1: A. B. Paul of the Calumet mine and mill has added 20 stamps to his mill, and will shortly put in 20 more, also built a fine suspension bridge across the river. Parties from French gulch inform us that Baker, Fox & Johnson have discovered some good prospects on an extension of the Wheeler ledge, and that the whole country is alive with prospectors. At Squaw creek the new mill on the Croesus mine will soon be in operation. A 200-foot shaft is being put down on the mine.

Sierra.

ABOUT SIERRA CITY.—*Mountain Messenger*, Sept. 1: Sierra Buttes and Young America companies are steadily crushing with all their stamps. The Marguerite company is preparing to resume work. Mr. F. Morris will superintend operations. The Empire company, Gold valley, has begun again to develop its property. Mr. Helling is making great effort to bring the mine out, and all wish him success. The Buffalo mine, Hog canyon, looks very promising, and is likely to become the best paying claim in this vicinity. It is expected that a 10-stamp mill will be erected before snow flies. The Mountain ledge appears very fair. Messrs. Gunzburger & Sunderhaus are there superintending the work. The Kentucky company has ceased operations for a short time, and a 10-stamp mill is soon to be erected. Jack Lloyd and John Iseman are opening a new mine at Port Wine called "Catch It if You Can."

Trinity.

AT CINNABAR.—*Journal*, Sept. 1: Everything is in a flourishing condition at Cinnabar. The Altoona quicksilver mine is being worked by a force of about 12, who are engaged in getting out ore and developing the ledge. The company will soon begin working the ore and producing quicksilver. About a mile from the Altoona the Ducks are sloping in their claim and have done well this summer. Indications point to lively times in Cinnabar the coming year.

Tuolumne.

NEW MILL.—*Independent*, Sept. 1: The 40-stamp mill at the Eureka Con. mine is being erected with all possible dispatch. It is thought that it will be completed in about two months. It is doubtful, however, whether there will be any water to run it before the rains come. The Pinetum mine, situated near Turnback creek, is reported as looking exceedingly well. A drift has been run some 80 feet on the ledge; the width of the vein cannot be told, as it is continually increasing in size and no crosscutting has been done, but it is supposed to be seven or eight feet.

NEVADA.

Washoe District.

COMSTOCK MINES.—*Territorial Enterprise*, Sept. 2: The prospects for miners and workmen generally have been exceedingly blue on the Comstock on several former occasions, but they have seldom been worse than at the present writing. This comes more from the fact that outside mining camps in Nevada are in the dumps than from our own demerits, and from the further fact that great expectations were pinned upon the bright prospects revealed in our mines by the development of paying ore bodies which induced miners to invest their earnings, from which investments, owing to untoward circumstances, they have been unable to realize a dollar. Here they have invested their earnings of the past year, and here they propose to recuperate their fortunes. The outlook to do this is anything but propitious. There are nearly 500 more miners on the lode than can find employment under the most favorable circumstances. It takes money to make money. Wouldn't it be better for the surplus miners to go elsewhere to earn the means with which to recuperate their fortunes than to drag further in debt and be unable to take advantage of opportunities that may be offered in the future? Everything is at a comparative standstill on the lode, and will so remain until milling power is afforded by winter snow and rain, when operations will be resumed on a scale commensurate to afford employment for a number of men 500 less than are now working or desiring work on the lode. This fact is self-evident, and working men should properly digest it rather than trust to their lucky stars, and swallow disappointment instead of beefsteak and Dayton potatoes at the outcome. By throwing off our extra working population every line of business and the workmen themselves will be benefited. Our unemployed men the year around is the biggest drag-net from which we suffer, and they are doing great injury by staying here. If this is not sound or plain talk, we would like to know its fallacy.

CON. CAL. & VIRGINIA.—On the 1300 level continue retrimbering the main south lateral drift. Continue to extract the usual quantity of good ore from the stopes east of the winze sunk below the 1435 level. On the 1500 level are continuing to extract ore from the southeast drift run from the upraise above the parallel north drift, 58 feet above the track floor of this level. The east crosscut from the main south drift is in 242 feet and has connected with the southeast stopes on this level. On the 1600 level continue to extract ore from the stopes around upraises Nos. 1, 3 and 4. An east drift from the top of the upraise at the north line has connected with a west crosscut from the north drift from the Con. Va. shaft on the 1500 level, making a valuable airway. On the 1650 level, the upraise above the drift running south from the east from the Con. Va. shaft is up 23 feet. Ore is being stoped from the south drift. During the week 1174 tons and 270 pounds of ore were shipped to the Morgan mill, and 1565 tons to the California mill. The average assay value of all the ore worked at these mills during the week, according to battery samples, was \$35.20. Bullion valued by assay at about \$65,000 now on hand in local office. Bullion shipped to the San Francisco office during the past week valued by assay at \$70,966. The Yellow Jacket shaft stopped work yesterday, and of course the shipments of ore to the Brunswick mill from the Confidence mine, which was hoisted through it, have ceased. During the stoppage the foundation under the hoisting machinery will be supplanted by new timbers, which are now on the ground. Everything is out of plumb, causing the breakage of spur wheels, etc., and the work is imperative. The repairs will occupy fully a month, during which time the mill will also be overhauled. Below we give such information as we have been able to obtain in regard to the leading Comstock mines.

HALE AND NORCROSS.—Since last report have hoisted 1250 tons of ore from the 600 and 700 levels, and have shipped to the Nevada mill 1190 tons. Average battery assays \$41.64 per ton. The stopes throughout the mine are looking very well. The west drift from the 500 station has been advanced 85 feet, making its total distance 275 feet. Have bullion on hand and previously shipped amounting to \$70,400 on August account.

SAVAGE.—Since last report have retrimbered 57 feet of the main vertical shaft, and a few days more work will leave the shaft in good working order. The south drift on the 500 level has been advanced 44 feet, making its total distance 244 feet. The car samples from the face of this drift average \$30 per ton. Are prospecting and easing timbers on the several levels of the mine.

ALTA.—Extracting the usual quantity of ore from the 825 level, and the mill machinery is running smoothly. The Keystoke machinery is also running well, and sinking to crosscut with the upraise from the 605 level has been resumed. Are opening a new station in the Alta and running a drift to the west to cut the vein on the 725 level.

OCCIDENTAL.—In the lower tunnel, 150 feet south of the north incline winze in the south drift, at a point 145 feet from the main tunnel, east crosscut No. 2 has been extended four feet; total, 17 feet. Extracted 132 tons of ore and shipped to the Douglass mill 150 tons the assay value of which per wagon samples was \$32 per ton.

BELCHER.—On the 570 level east crosscut is out 185 feet. No change to report in the ground. The face is in soft porphyry. The repairs to the vertical shaft are completed. Are repairing the sheave at the head of the incline. The Sutro tunnel drift is out 620 feet.

UTAH.—On the 472 level, in the north lateral drift opposite west crosscut No. 5, or 150 feet north from the point where the incline upraise was carried to the 372 level, an east crosscut has been advanced 32 feet. The formation is porphyry showing streaks of quartz.

GOULD AND CURRY.—All the work during the week has been confined to repairing the main shaft and airways leading to the old stopes. Have discontinued shipping ore to the Douglass mill, as the yield per ton was below the cost of extraction and milling.

MEXICAN.—On the 1465 level a joint Union drift started from the east drift from the Ophir shaft at a point 150 feet in, is advanced 110 feet.

CONFIDENCE.—Last week shipped 182 tons of ore daily to the Brunswick mill, average battery samples of which were \$26.50 per ton. Shipments stopped

yesterday owing to the closing down of the Yellow Jacket shaft for repairs.

JUSTICE.—Are running north, southeast and east on the 600 level and taking out ore as it comes in drifting without stopping. Are hoisting about 15 tons daily, and have about 2500 tons of milling ore on the dump.

ANDES.—From the west drift on the 350 level are now going north in a streak that looks promising, yielding a little ore. Are going south on the 240 level from the west crosscut on a streak that is looking well.

CROWN POINT.—The south drift from the 201 level crosscut is in 28 feet, having advanced 28 feet during the week. The face is in soft porphyry, showing seams and streaks of quartz.

YELLOW JACKET.—Stopped the hoisting works yesterday. Will put a new foundation under the machinery. The work will take a month. The shaft itself is in first-rate condition.

OPHIR.—On the 1465 level the old east drift is reopened 150 feet. The southwest drift from upraise No. 2, 36 feet above the track floor of this level, is still being retrimbered.

BEST AND BELCHER.—On the 1300 level the north drift repairs have been completed, and have resumed work in west crosscut No. 1 from the El Dorado tunnel level.

SEG. BELCHER.—The south raise is now up 60 feet vertically above the southeast drift. No change to report in the ground run through.

SIERRA NEVADA.—On the 520 level, east crosscut No. 3 is advanced 292 feet. It is still in porphyry with clay slips showing some water.

BENTON.—Worked has ceased. President Hill is expected on the lode shortly, when operations will probably be resumed.

CHOLLAR.—Are doing the usual work of prospecting and repairing in the mine, but are not hoisting ore at present.

ALPHA AND EXCHEQUER.—Drifting north on the 382 level and sinking and timbering the shaft below the 500 level.

IOWA.—Nothing new to report this week. Are making tests of float rock and also of rock near the surface.

CHALLENGE.—Prospecting on 1000 level continues and repair work throughout heavy ground in the mine also.

BALTIMORE.—Are crosscutting in the ledge on the 338 level. Upraise No. 2 in very good ore.

BULLION.—Are drifting south on the 640 level and are crosscutting east on the 500 level.

SCORPION.—The south drift on the 500 level has been extended 15 feet during the week.

POTUSI.—Progress only is reported in the work of exploration and repairs in this mine.

UNION CON.—[Report is identical with that of Mexican.]

Belmont District.

SPANISH BELT.—*Courier*, Sept. 1: The Barcelona mine, Spanish belt, never looked better than it does now. There is an abundance of rich ore in sight ready for stoping, and sufficient low-grade ore to keep two or three concentrating-mills steadily employed can be easily extracted. The Monitor Belmont mill ought to be repaired and the high-grade ores worked at home. This mine is one of the most extensive on the coast, and when it is properly opened by a perpendicular shaft of sufficient size for its advantageous working, it will prove one of the most productive mines in America.

OTHER CAMPS.—The mines of Northumberland district are producing good ore. James Latt's mine, East Belmont, is producing high-grade ore. Only 14 men are now at work on the Seligman. There seems to be a general depression all over the State, and very many men have in the past month been thrown out of work. Two teams of ore left yesterday for Eureka—Matson, with about 15 tons from Swansea Canyon, and Isaacson with about six tons for Jacobson & Simons. The following shipments of ore were made last week to the Eureka furnaces: From the Sub Rosa mine, 2½ tons; White Pine, 7 tons; Revelle, 1½ tons; Williamsburg, 4½ tons; Mineral Hill, 1½ tons; Lincoln, 4 tons; Northumberland, 5 tons; Tybo, 8 tons; Kentuck, 2½ tons; and Dimmick, 1½ tons. From the Leonie mine, 32 tons; Members, 29 tons; and Silver Conner, 56 tons.

Candelaria District.

MOUNT DIABLO MINE.—*Walker Lake Bulletin*, Sept. 1: The winze below the sixth level is down 13 feet and shows a few inches of low-grade ore. The crosscut in the intermediate east of the shaft, between the fifth and the sixth levels, has been stopped and a drift started in the ore found in this crosscut. In the west intermediate between the fifth and sixth levels we have two small stopes, both yielding ore of fair grade. The main stope between the fourth and fifth levels is giving some \$60 ore. The west stope above the fourth level shows some improvement. The east stope on the third level now shows but little ore. East of the shaft between the second and third levels we have a stope on a small lode that looks promising. The banging stope between the second and third levels shows five inches of \$300 ore. The east stope above the second level is giving considerable \$30 ore. The intermediate stopes between the first and second levels show no change. We have a north crosscut between these levels that is now in 16 feet and shows a few inches of \$300 ore. A north crosscut has been started from the west drift on the first level and is now in 23 feet. The east drift above the first level is in 259 feet. The stope above this level shows no improvement.

Pioche District.

YUBA MINE.—*Record*, Sept. 1: The winze of this mine from the 11th level has reached a depth of 12 feet, showing the vein of high grade free ore to continue regularly in width and richness. The last vein sample at a point where the width was 13 inches assayed 500 ounces silver per ton. The crosscut from the 12th has now, in ten days' time, penetrated north toward the ledge 30 feet. This remarkable progress was owing partly to the existence of an open fissure running with the work across the country toward the main ore fissure. The Yuba Co. has heretofore been paying \$75 per month for water from the Floral Springs, for their hoisting works. The management of the estate of the late R. H. Elam, who owned the water, decided to raise the price to \$150 per month. As this does not meet the views of the

Yuba Co., its managers have decided to obtain water by hoisting through the Pioche Con. Co's. No. 3 shaft and pump it thence to the Yuba, which is about 250 feet higher.

Hawthorne District.

STRUCK ORE.—Esmeralda *News*, Sept. 1: The Black Hawk mine is situated about a mile north of the Lapanta, in Hawthorne Mining District. It is owned by B. Prior, the well-known and indefatigable prospector, who has been at work on the claim for the past two and a half months. In that time he has sunk a shaft 18 feet and run a number of drifts. While engaged in sinking the shaft, he extracted some 15 tons of ore (now on the dump) which he estimates is worth \$50 per ton. At the bottom of the shaft, Mr. Prior uncovered a three-foot ledge of ore, assays from which go all the way from \$100 to \$200 per ton in gold. According to present indications, Mr. Prior has a nice stake.

Tuscarora District.

WORK ON THE MINES.—*Times-Review*, Aug. 31: Work on Del Monte has been suspended in the tunnel and the joint shaft sunk 8 feet.

GRAND PRIZE.—First drift, 200-foot level, has been extended 10 feet and west drift 12 feet, face of both showing low-grade ore. A great deal of ore has been left standing in the stopes from the 200 and 300-foot levels, but is mostly low-grade for milling. Work in all parts of the mine has been suspended for the present, for the purpose of repairing the shaft, preparatory to freeing the mine of water to the 400-foot level, after which that portion of the ore body extending downward from the 300 foot level (that lying above having yielded over \$100,000 in bullion during the past six months) will be developed on down. On the Commonwealth and the Nevada (Queen developments and ore extraction are being prosecuted with the usual energy and success.

FOUND TREASURE.—Southeast drift on the southwest vein, 150-foot level, has been extended 10 feet. Upraise No. 3 will connect with the drift of the 100-foot level by to-morrow. The dirt which had run into the crosscut and drift of the 200-foot level has been cleaned out, and work has been resumed in the face of the southeast drift.

NAVAJO.—The crosscut from the south drift, 350-foot level, has been extended 6 feet. North drift from No. 2 winze, east vein 250-foot level, extended 9 feet, face still in good ore. South drift on west vein, 150-foot level, extended 8 feet. The stopes on the 300 foot level continue in high-grade ore.

NORTH BELLE ISLE.—East crosscut No. 2 north, 300-foot level, extended 5 feet. The stopes on the 300-foot level continue in high-grade ore. The joint upraise on the 400-foot level is up 20 feet, showing high grade ore all the way.

ON THE NORTH COMMONWEALTH.—Work has been discontinued in the prospect shaft and level and the joint shaft has been sunk 8 feet.

ON BELLE ISLE.—East crosscut, 250-foot level, extended 8 feet in hard rock. The stopes are without material change.

ARIZONA.

CAMPS ABOUT PRESCOTT.—*Journal*, Sept. 3: Five tons of ore from Slate creek, the first shipment of carload lots, arrived yesterday at the sampling works for George Sines. He expects the balance of the carload within a week. Supt. Williams of Copper basin is not pushing work very rapidly on that property, his motto apparently being to "go slow, but sure." Notwithstanding the absence of any hurrah, he has done a great deal of work there in the past few months. He has taken out large quantities of ore and has opened up very much more. Work of erecting a smelter has commenced and the machinery for a new sawmill for the company has arrived. We expect to see a steady progress and improvement there until the camp becomes one of the largest in Northern Arizona. H. A. Owens is developing the property recently located by him on the Santa Maria with very satisfactory results. The ore is very high-grade gold.

GREAT EASTERN GROUP.—This group of mines has now become one of the most promising properties in the Vekol range of mountains. It lies in one of the largest basins of the range and joined to the Vekol as it is, it has become as prolific in substantial production as the former. On the first of September the Vekol mill starts on Great Eastern ore. This is the third large run this year. A short line of railroad over a level country about 25 miles to the Great Eastern and Vekol range of mountains, would bring into existence the most prosperous mining camps on the Pacific Coast. The Queen of Sheba silver mines in the same range are expecting pushing and active development very shortly.

COLORADO.

EAGLE RIVER DISTRICT.—Red Cliff *Times*, Sept. 1: The Champion is putting in a new engine and hoister and preparing for large shipments. J. B. Taylor has taken the lease on the Pine Martin. He has some ore in the breast that runs 20 ounces in gold. The Blue Bell has a streak of galena and sulphide in the breast which averages six inches. The property is steadily improving. The Black Tiger heading is working under contract to William Gay & Co. Work has ceased in the rest of the mine until the contract is finished. The Last Chance lessees took out some ore last week that made the eyes of old-timers stick out. Sulphides massed with gold, and brown hematite literally covered with the ore. The Polar-Accidental is now in 800 feet. The main incline has been in ore for the last 140 feet, and is still going through ore. This is one of the best properties on Battle mountain. The ore from the mine at present is coming from drifts only, no stopping being done. Fred Thackwell opened up a 5-foot body of hematite iron on the Mexican Maid, in the lime contact. This iron occurs in the ore bodies on Battle mountain. The prospects are encouraging for a large body of ore. The strike is about 15 feet from surface. The lessees on the Horn Silver have struck the edge of the main ore-channel this week after running a crosscut 150 feet off the main incline. A two-inch streak of horn silver and chlorides, assaying \$2000, is part of the find. Messrs. Smith, Hahn, DeLee and Mays displayed good staying qualities and judgment in the prosecution of this work, and we are pleased to note their well-merited success.

LEADVILLE.—*Chronicle*, Sept. 3: The Lee Basin Company is not getting as much ore out of the

Olive Branch mine as it was a few weeks ago, and shipments have fallen off to about 500 tons per month. The ore is, however, of much better grade. Not a lot has been shipped for over a month which has assayed less than 100 ounces of silver. The Olive Branch workings are in ore everywhere, except one drift which is being driven south from the incline for prospecting purposes. The breast of the incline is in ore, and back-stopping has been commenced from it on both sides. The incline is to be driven ahead again very soon. The Lee Basin Company can drive ahead 200 feet more under the terms of the Olive Branch lease. The scheme of sinking a new shaft in the center of the park to command this ground, has been abandoned for the present. The Olive Branch ore is shipped to the Boston & Colorado Smelting Company. In the Lee Basin territory, worked through the Tiptop, the ore which was struck some time ago is becoming low grade. There is a considerable amount of it, but it is too poor to ship. The ore is sulphide and oxide in lime. Experiments with concentrating it are to be made. There are some streaks of gold ore running through the bodies of low-grade ore, and drifts following them are being driven. The company is taking out about 200 tons per month from them. The stock of the Lee Basin Company is selling in New York for 70 cents per share.

SILVER PLUME DISTRICT.—*Standard*, Aug. 31: The Hall tunnel is now in about 600 feet and is being driven from 20 to 25 feet per week. A vein of ore one foot in thickness and worth \$150 a ton, has been opened in the Lucy group of mines. Jerry Burns is pushing work ahead on the lower adit of the County Treasurer lode in West Argentine. A 2-foot vein of solid ore has been opened in the fifth level, east of the main shaft in the Jo Reynolds mine. Tom Powers milled a small run of ore last Saturday from his Delaware lease that netted in one class 184 ounces of silver to the ton. In the month of July H. M. Griffin sold 250 tons of ore from his mines near here, containing 13,000 ounces of silver, 100 tons of lead and a small quantity of gold. There is at present considerable ore coming out of Brown gulch and all of it is of good grade, thereby allowing the lessees up that way to receive good returns for their work. Sadlier, Myroie & Co., lessees on the upper Mammoth, are at present stopping on a large-size streak of ruby and gray copper. The lessees also have the nicest ore-house that we have seen lately.

DAKOTA.

MINES ABOUT DEADWOOD.—*Pioneer*, Sept. 1: The Homestake Mining Company of Dakota paid August 25th dividend No. 121, of 20 cents a share, aggregating \$25,000, making \$200,000 paid this year, and \$4,198,750 paid to date. Twenty-five bars of 70 pounds each, bullion from the Bullion-Merritt smelter, were brought over yesterday and piled up in front of the Deadwood bank. At the Jumbo group of mines, two miles east of Deadwood, the work of development goes on apace. Two incline shafts have been sunk in ore, the one to the depth of 80 and the other 200 feet. The ore is a carbonate and galena vein four feet thick, average assay of ore 566 per ton. Work on the Anna mine consists of one tunnel 250 feet long following the ore vein and another 300 feet. At the end of this tunnel is a shaft which was sunk in a large body of ore. This is free-milling gold ore assaying \$18 per ton. Adjoining this mine on the south is the Ophir group, consisting of three claims. The workings on the Ophir are situated about 100 feet from the Anna and also on the same vein bearing the same class of ore. The development of this property consists of three large open cuts, also an incline shaft to the depth of 100 feet. Eight miles farther south is situated the Neptune group of mines, where work on shaft and tunnel is being actively prosecuted. Farther on at the village of Perry is the Uncle Sam mine. Some years ago when this property was owned by prospectors, a narrow vein of free-milling gold ore was discovered upon which was placed a one-stamp mill with the capacity of one ton per day, and a result of \$100 per ton. With the profits of this mill they were soon enabled to erect a 20-stamp mill, which was in successful operation when it was sold to New York capitalists, who immediately erected a 60-stamp mill and also large hoisting works. A large Cornish pump having recently been purchased will soon be erected on the works and operations resumed. The mine under present management promises to be one of the largest bullion-producers in the Black Hills. East of the Uncle Sam is the El Dorado group of mines, consisting of three claims. This property has quite an extensive development and is mostly owned by prospectors.

DEADWOOD.—*Pioneer*, Sept. 1: We were shown an assay of carbonate ore from the Ontario mine which will average \$95 per ton, and it is said they will soon have a good body of that kind of ore, as it is gradually widening. This will at no distant day be one of the best producing mines of the galena camp. There is no doubt but that this will soon come to the front of the producing camps of the Black Hills. Those who are working as hard as Lynn and Sebastian certainly deserve success. The Merritt-Bullion Smelter Company paid off yesterday. Some \$700 were distributed among employees.

IDAHO.

ELK CREEK.—*Cour d'Alene Record*, Sept. 3: Development on the Elk Creek group of gold mines continues with unabated vigor. To say that they improve in appearance as work progresses is but faintly to express the exact condition of affairs. The results obtained in the mill, although working on the lowest grade ore yet found in the vicinity, are proof sufficient of the great wealth contained in this auriferous region. The camp is full of life and animation and 100 men, including miners, carpenters and other mechanics, are on the payroll. Elk Creek has been tapped 1800 feet from the mill for an additional supply of water, and a number of men are now employed in putting in a flume for that distance. The work of increasing the capacity of the mill to 20 stamps is progressing, the additional batteries are now being put in place. A partial cleanup on Thursday yielded three bars of gold weighing 17 pounds worth \$17,40 per ounce, making a grand total of \$3549.60.

SUNSET PEAK.—Sunset Peak rises in majestic grandeur from the midst of surrounding mountains and clustering hills, mighty in themselves, but insignificant when compared to the towering high-

occupied by this grand old king of the Cour d'Alene. On this exalted station are located a group of mines owned by the Portland Mining Company and known as the Silver Tip, Sitting Bull, Red Dragon and the Mule Deer. The chief development work has been confined to the Silver Tip and Sitting Bull. On the first named a shaft is down 60 feet with considerable drifting in the bottom which shows an ore body 14 feet in thickness. There are other minor openings, displaying the same body of ore which carries galena, gray copper and sulphuret of copper. The work on the Sitting Bull consists of two tunnels driven on the vein, which is the same as the Sunset, to an aggregate distance of over 3000 feet. The company is now engaged in building roads, ore dumps, trails and house, and is making every preparation necessary for winter work. Supplies of all kinds sufficient for a season of six months for a force of from 12 to 20 men will be in store before winter sets in. The buildings will be all completed by the 15th of September, so that no cessation of work can be anticipated from inclement weather. Railroad surveys have been made and it is expected that this mining district will be on a shipping basis within the next 12 months. The ores of the district average as high a grade as those found in the best mineral zones of Cour d'Alene, while the veins are fully equal to, if not stronger, than any yet discovered. The vein system of the Sunset Peak can properly be classed as a mineral zone, in which occur several distinct veins, not less than four in number, and indications point to the existence of two others, making the entire width of the mineral zone about 2000 feet. These veins run parallel to each other and vary in width from one to 20 feet—the central vein, on which is located the group above referred to, being the most prominent, probably from the fact of its being the most developed; while the physical structure is identical to that of the other vein systems of Cour d'Alene, that is, they cut the formation at an acute angle, and the formation here as in other districts is composed of ferruginous slates, while the vein gangues are quartzite.

BEAVER DISTRICT.—The Fay Templeton Mining Co. is now erecting two of the largest sized Huntington mills that are guaranteed to crush 50 tons of ore per day. The machinery will be shipped from Chicago on next Tuesday, the 28th inst. The mill-site which is right at the mine has been prepared and the mill buildings and flumes now under construction will be completed and ready for the machinery when it arrives, which will be in about three weeks. The Fay Templeton mine has developed wonderfully of late, and now exhibits one of the largest bodies of quartz to be found in the camp, the vein at places showing a thickness of 30 or more feet. Several hundred feet of tunnel work in good quartz have been already driven and thousands of tons of ore are on the dump ready for the mill. An arastra crushing a ton a day has been running all summer at great profit, the first run averaging \$22 per ton, and since then the product has steadily increased, the last run averaging over \$40. Unless all indications are at fault the mine will prove a bonanza to the company as well as to the camp. The introduction of the Huntington mill will be a novelty in Cour d'Alene, and to many will look like an experiment, but the Fay Templeton people have given the matter a thorough investigation, and they feel satisfied that this method of crushing will give better results than could be obtained from the use of any other tried mill. There are many of these mills now in use in California and Mexico, and from the sworn statement of the receiver of the Spanish mine of Nevada county, Cal., no other mill can crush as much quartz as economically as the Huntington. It is hoped its erection on this mine will verify his statement. The process is a combination of the stamp-mill and arastra, and is highly recommended for its amalgamating capacity.

MILE GULCH.—Work is progressing favorably on the Last Chance mine. The lower tunnel is in 200 feet, a distance of four feet being gained in its extension every day. A further distance of 200 feet will have to be attained before the vein is cut. The levels east and west of the upper tunnel are being driven continually, eight-hour shifts being employed. From three to five feet of good concentrating ore is visible in these workings, and in the stopes a body fully five feet in width is exposed. There are now 2000 tons of ore on the dump. The concentrator for the treatment of ores from both the Emma and Last Chance mines is rapidly nearing completion. One carload of machinery has been delivered, and if no delay occurs in the arrival of the other portions of the plant the mill will be ready to work by the 15th of next month. The tramway from the mines to the concentrator is nearly finished, not over 300 feet of additional work being necessary to complete it.

THE STEMWINDER.—The engine whistle of the concentrating works at Kellogg is again heard, and the buckets of the wire tramway are once more seen making their regular trips from the Stemwinder mine to the mill. This well-developed lode is again added to our list of shippers, work having been resumed at the concentrator on Wednesday, and will in future continue treating ore from the Stemwinder mine.

BUNKER HILL & SULLIVAN.—The Bunker Hill & Sullivan Mining and Concentrating Co. declared a dividend on Saturday, the 18th inst., of \$40,000. An immense amount of ore is now in transit from the mines and another and larger dividend may be looked for at an early day.

MONTANA.

PLACERS.—*Inter-Mountain*, Sept. 3: The placer diggings in the Sweet Grass Hills in Northern Montana are now being worked to good advantage. The old-time miners are making money there, and quartz claims are being located rapidly.

VARIOUS MINES.—The Granite Mountain Mining Co., Deer Lodge county, gives in for assessment its net output for the year ending July 31st at \$2,200,000. Work at the company's mill-site is making good headway, though the hard nature of the country rock makes progress a little slow at times. About 175 men are now employed and it is expected that several more will be put to work soon. The railroad right-of-way has not been definitely settled for the entire distance yet. The Cumberland Co. last week shipped from Castle 74 tons of ore. The net receipts for the month of July amount to \$4600. The number of tons shipped for the month is 175. The Champion shaft, now 170 feet deep, is going down two feet per day on the

vein; there is ore clear across the shaft, and 18 inches will assay 300 ounces. The new li-Metallic hoisting works at the mine are being pushed ahead with great energy, and will probably be completed in about 20 days. Will soon employ as many men as before the fire, and expect to resume operations and take out ore in about six weeks.

THE BIGGEST HOIST.—The Drumlummon mine is now engaged in putting in the largest hoist in Montana, if not one of the largest in use in any mine in the country. The hoist is located 600 feet under the ground, and is capable of hoisting to a depth of 5000 feet. A large excavation has been made at the 600-foot station for the hoisting plant, which will be walled and arched with solid masonry.

ABOUT BOULDER.—*Age*, Sept. 3: W. B. Gaffney has some excellent properties near Hecla, in Beaverhead county, and is considering an offer from Butte parties to bond them for the sum of \$50,000, with a considerable sum put up as a forfeit if the mines are not taken. Work on the Bigfoot has been temporarily shut down, owing to the large amount of water coming into the shaft, which is now down 130 feet. Additional pumps will be put into the mine shortly so that the work can be resumed. The outlook for the mine is very promising. The shaft on the St. Paul lode is now down 65 feet and its owners have determined to sink 100 feet further. To that end a whim is being built and necessary buildings to live in are being erected. The property is a very promising one, and the owners are determined on finding out what there is in it. They have a six-foot vein of good ore.

WISCONSIN CREEK MINES.—A bar of gold valued at \$2000, the product of Champion mine, has been brought in. It is from the lowest grade ore in the mine, and was turned out in 20 days' run of a five-stamp mill. The vein is in granite, and the ore body opened is 160 feet long and four feet wide. The ore mills on an average about \$23 per ton. The best ore yet developed in any of the group is in the Sheridan, 20 inches wide, opened for 60 feet along the vein, a depth of about 60 feet. This ore is all of excellent grade, and will run from \$50 to \$100 per ton.

JEFFERSON COUNTY MINES.—*Review*, Sept. 1: The Minah mine, in the vicinity of Wickes, is showing up splendidly and making regular shipments of ore, part of which goes to Omaha and part to Wickes, the high-grade ore being worked at the former place. For the past two weeks the smelter at Wickes has not been running full capacity, one of the three stacks having been shut down for repairs. Everything is now in good shape and the smelter in full operation. Prospecting around Wickes is brisk, the hills are dotted with searchers for the precious metals, and owners of claims are doing their assessment work. The increasing demand for lead ore is giving a great impetus to mining and bracing up the heart of the prospector with that most healthful of tonics—energy and hope.

NEW MEXICO.

LOROSBURG.—*Eastern Liberal*, Sept. 3: The Volcano mine started last week. A Santa Fe man claims to have learned from the Spanish records just where a valuable quicksilver mine is, and wants to be grub-staked while he prospects for it. Jeff Whittington was in town Saturday on his way to El Paso with 6 tons of ore for smelting. Eleven tons are from the Comstock and five from the Silver Twig. The ore is of a very high grade, as it has to be to stand a shipment from Morenci to El Paso. Superintendent Foster received orders to shut down the Standard mill, which he did Monday. We are not informed as to the reason of the shut-down, but are certain it is not for lack of ore, nor from unsatisfactory mill returns. The company shipped about 20 tons of high-grade concentrates and a \$2400 gold brick this week.

DISPOSING OF ORE.—Miners often receive unsatisfactory returns from miners after shipping ores to them. This may often happen because the smelters do not need just the class of ore they ship. In Denver there is a good system of handling ores. The Union Pacific Ore Sampling Works send a sample of all ores they receive to six different smelters and the smelters bid on it, the ore going to the highest bidder. The company recently issued a bulletin giving the bids on 14 different lots of ore, and it was quite interesting to note the range in prices.

CARLISLE COMPANY.—This company intends in the future to make Lordsburg its shipping point instead of Duncan. It will take 25 or 30 teams to do the work, hauling concentrates into town and coke and supplies to camp. As the supplies for the teams and drivers will all be handled here, this will be something of an addition to the business of our town.

DITCH AT LAS CRUCES.—*Republican*, Sept. 3: An El Paso surveying party is running two lines from the mouth of the Mesilla valley ditch to intersect the old ditch at some point near the bend on Earham lands. The ditch mouth is pronounced by the engineers as good as any in the valley.

WASHINGTON.

DEEP CREEK.—Spokane Falls *Herald*, Aug. 26: Apparently valuable lead deposits are said to exist on Deep creek, near Colville. Jos. Campbell and Gus Henderson have some hearty looking claims there.

HOPE STATION.—Several of the ledges here are showing up well. Jas. A. Donaldson was in town during the first of the week from near Hope Station, Idaho. He is interested in several mining claims in that vicinity which show up well. Considerable of the ore assays high in silver and lead, while some is rich in gold. There are several healthy looking leads across Lake Pend d'Orielle from Hope.

WYOMING.

COAL MINES.—*Tribune*, Aug. 28: One of the largest bodies of coal in Central Wyoming is said to be in Bates Hollow, on the North Platte river, where veins of coal cross running north, south, east and west. On one section of land are to be seen cropping out 26 distinct veins of coal from 3 to 13 feet thick. It is reported that Shibly Bros. of Nebraska, who own a half interest in the property, are perfecting arrangements to open it up as soon as shipping facilities can be secured.

MECHANICAL PROGRESS.

Construction of Steam Cylinders.

The triple and quadruple expansion marine engines of recent introduction call for very high boiler pressures. Several steamships now carry 170 pounds of steam. With the late two-cylinder compound system the gauge pressure was generally about 85 pounds. The cylinder was calculated as to thickness to resist a working tensile strength of about 2000 pounds per square inch of section, though some were subjected to only 1200 pounds. The thickness of such cylinders varied from $1\frac{1}{2}$ inch to $1\frac{3}{4}$ inch thick. Of course one inch in thickness was ample to withstand the steam pressure, but there are other points that need consideration, such as re-heating, handling, water shocks from pressing, etc.; hence the extra thickness.

The 42-inch cylinders now in actual use on modern triple-expansion engines, where the initial steam pressure is 170 pounds above the atmosphere, are usually from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches thick, and are, when jacketed, in most cases in the form of linings, so that the space between the lining and the main casting is filled with live steam from the boiler, thus forming a jacketed cylinder.

For the highest steam pressures, initial steam cylinders up to 50 inches diameter need not be more than two inches thick, and if there is no jacket, the reinforcing ring or rib can be introduced. Cylinders so reinforced can be re-bored until the thickness is materially reduced.

One great trouble with all large steam cylinders is the warping, or drawing, and a general distortion of the walls of the cylinder, when heated, this action being very prominent in those cylinders having large steam and exhaust chest, and passages cast on them. Some engineers have adopted the plan of making the cylinders very thick, in order to partly prevent this warping of the cylinder proper.

Such designs are entirely unnecessary, however, as the circular ribs will answer all the purposes of the extra thickness, and are far better when other points are considered.

As to the strength of the average steam cylinder, the greatest number of fractures appear to have been caused by longitudinal strains and blows (in line with the bore) received during periods of excessive priming of the boilers and racing of the engines.

To prevent this liability of fracture, two or three large lugs are sometimes cast on the upper and lower flanges of the cylinder. Through these lugs from one end of the cylinder to the other, large, soft-steel bolts are passed. These bolts are brought to a uniform stress, while the cylinder is at its average temperature. Under these conditions, when any undue strains or shocks occur, the force of these strains is immediately transmitted to these tension bolts, which, being of superior tensile strength, relieve the body of the cylinder of at least one-half of the shock. No detail can be too safe in the construction of steam machinery for the marine service.

We condense the above from an article in the *American Machinist* by W. H. Hoffman.

EXTENDING AND IMPROVING BLAST FURNACES. Robert Grimshaw, in *New York World*, says: In our country the last two years have witnessed astonishing activity in the construction of new blast furnaces and steel works. One firm alone constructed 10 entirely new blast furnaces (eight of them being in Tennessee and Alabama), remodeled 10 more, and built six steel works, representing in all an outlay of over \$2,500,000. In connection with the construction of blast furnaces, the use of fire-brick hot-blast stoves and in preheating the blast is becoming more and more prevalent. A cast-iron stove heats the blast to say about 900° F., while a fire-brick stove can furnish up to 1600°. This extra amount of heat introduced into the blast decreases correspondingly the consumption of fuel, so that in well managed furnaces using good ores the past year has seen the lowest fuel consumption to the ton of iron ever reached in this country, and probably in the world. Published results show that one gross ton of iron has been made with 1850 pounds of coke, and many furnaces show an average record of between 1900 and 2000 pounds of fuel. Fire-brick hot-blast stoves have been greatly improved lately. They have been made more manageable, their construction more simple and the first cost lower. One firm constructs a special form of fire-brick hot-blast stove, combining the Whitwell and Cowper systems with certain valuable improvements patented by Mr. Fred W. Gordon.

THE LOCOMOTIVE ENGINEER.—The locomotive engine of to-day, says the *Railway Age*, is a marvel and a mystery to the casual observer, and very few except those engaged in making or running engines are aware of the number of appliances which the engineer has to manipulate or the uses to which they are put. A railway manager in speaking in regard to the work of the locomotive engineer once intimated that it required no particular skill to run an engine, as it was simply necessary to "keep the teakettle boiling." This was not a fair statement then and is still less so now when the complications of locomotive construction have been increased by the addition of various appliances not known years ago, such as the steam-driver brake, train brake, steam-heating apparatus, etc., while at the same time the requirements upon the en-

gineer in respect to speed, weight of train, number of trains to be looked out for, etc., have considerably increased. It is true a good locomotive runner does not need to be an engine-builder or even a good mechanic. His work is one in which expertness is gained by experience and care and is not a matter of superior education or book knowledge. But the really intelligent locomotive engineer will have some knowledge of the theory of locomotive construction, and it is an encouraging fact that of late years engineers have shown an increasing disposition to obtain books treating of their occupation and to make them a study. While an engineer need not be able to build an engine he must know enough of its principles to understand what to do in case of a break-down, and as a matter of fact very great skill and ingenuity are frequently exhibited by engineers and firemen in trying emergencies.

A NEW STEEL CASTING PROCESS has recently been introduced, which, according to *Industries*, bids fair to soon become a powerful co-operator in the great field which is daily enlarging and in which the manufacturers of steel castings and the world in general are reaping rich rewards. The process consists in passing molten steel or iron through a filtering medium or bath of a purifying and deoxidizing alloy of less specific gravity than either steel or iron; such bath or filtering medium rises and forms a stratum or film on the surface of the molten steel or iron, through which every particle of snaf steel or iron subsequently melted passes before reaching the lower part of the furnace from which it is tapped. The chief active component of the bath or filtering material is titanium. The alloy is produced in a peculiarly constructed cupola at the commencement of the operation, and is obtained by using an aluminous ore containing from 10 to 12 per cent of titanium. The stratum of alloy should be not less than one inch in thickness for each ton of ore to be treated. The steel on being passed through this medium as it melts is cleared of impurities and the resulting castings are free from honey-combs or blow-holes, and are of remarkable toughness. The inventors claim that the time required for annealing castings made by this process is much shorter than with ordinary castings, and that delivery can always be made in much less time. These castings will be very valuable for gun-makers for the manufacture of shells and other projectiles, and for whatever other purpose where toughness is required.

NEW SHAPING TOOL—A new device has lately been patented and put to practical use at a manufacturing institution at Fitchburg, Mass. It may be briefly described as a machine in which two flat surfaces, acting vertically or horizontally, and moving in opposite directions, with adjustable dies fixed upon them, roll in one motion a piece of metal regular or irregular in shape and of almost any pattern desired. At a single stroke of the mechanism may be obtained a sphere, a cone, a chair screw, a bolt with thread and head, a car or carriage axle, and an endless variety of other forms. The shop was visited by a large delegation from the Institute of Mining Engineers at its late session in Boston, and the visiting experts expressed themselves as very much amazed and delighted with the work of the machine.

MACHINE RIVETING continues to make progress and there are now several very useful apparatus on the market. It is no longer doubted that machine riveting is the best. During a recent visit to the Clyde we carefully watched the riveting machines at work, and also closely examined the work by the hammers, and were fully satisfied that the squeeze given by the machine tends to press up the shank of the rivet throughout its entire length, thus more effectually filling up the hole. The hammer only makes a succession of dents on the rivet end. In bridge-building, as well as in ship-building, the machine is fast superseding the hammer.—*Ex.*

HEAVY RAILS.—Steel rails weighing 90 pounds per yard have recently been rolled by the Bethlehem Iron Co. of Bethlehem, Pa., for use on the Reading railroad. These are said to be the heaviest steel rails ever rolled in this country. It is intimated that both the Reading and Jersey Central roads are going to renew the track on their main lines across New Jersey with much heavier rails than those now in use—from 89 to 92 pounds per yard.

PREVENTING ACCIDENTS FROM MACHINERY.—An exhibition will be held in Berlin next spring, under the auspices of the German Government, to disseminate a knowledge of the apparatus and devices that have been invented for the prevention of accidents among those engaged in the operations of machinery and all the various branches of industry. An invitation has been extended to the United States Government to participate.

SHIPPING ALUMINUM TO ENGLAND.—A telegram says that 150 pounds of chemically pure aluminum, smelted from Kentucky cryolite and clay, was exported this week from Newport, Ky., to England. The aluminum sold at 50 cents per tray ounce. A telegram adds that "the process of smelting is as yet a tedious one, and kept secret by the inventors."

One drop of oil per hour, regularly delivered, will lubricate a very heavy bearing.

SCIENTIFIC PROGRESS.

A Visit to the Past.

The books which have been written about Egypt during the past century are numerous; but it seems that we are really only at the threshold of the work of Egyptian discovery. It is not too much to say that the last ten years have added more to our knowledge of Egypt than the ten centuries previous. We may add that the work done in the past twelve months has been more valuable than that of any previous year of the ten.

Much of this work has been done by Mr. W. M. Flinders Petrie, an Englishman in the employ of the Egypt Exploration Society. It was he who in 1885 discovered the remains of Naucratis, a city so ancient that its very site had been forgotten in the time of the Roman Empire, and in the following year laid open the Ptolemaic palace at Tahpanhes. He has now won fresh laurels by the discovery, this year, of the pyramid of Hawara, and the labyrinth adjacent, which are said by ancient historians to have been far more wonderful than the pyramids which travelers go to see at Cairo. The pyramid, which was the tomb of Amenemhat III (Mœris of the Greeks), was described by Herodotus as being 240 feet high, and is said by other writers to have been the most renowned building of antiquity. In it the remains of its founder repose; it will remain there until Mr. Petrie returns in the fall, when it will probably be removed to stand by the side of the mummies of Rameses II and Rameses III in the museum at Boulak. This Amenemhat was one of the great engineers of antiquity. To him are ascribed the canals and reservoirs by which Northern Egypt—now a sand waste—was made to bloom like a garden. He laid out the labyrinth, which was described as the greatest of all the wonders of the world. And this great monarch, after a long reign, which was full of service to his country, and after a repose of several thousand years in a tomb so massive that army after army tried and failed to penetrate it, is now going to be set up in a glass case in a museum for Americans and Englishmen to look at.

Hardly second in interest to Mr. Petrie's discoveries at Hawara are the definite location of Bubastis and its famous temple. Bubastis is set down on all the maps as a ruin on one of the branches of the Nile, about a hundred miles north of Cairo. But it is in so desolate a sand desert, and there are so few remains of anything like civilization in the vicinity, that many have doubted whether this was the spot which had been the center of ancient fashion, and luxury, and pleasure, and frivolity 5000 years ago. It seems that it is. Remains have been found which must have belonged to the famous temple. It was a gorgeous edifice, situated in a grove, which was girt on all sides by an artificial branch of the Nile. It was dedicated to the Egyptian goddess Bast, who, though occasionally identified with the Diana as well as with the Venus of the Greek Roman mythology, was worshiped with rites which stamp her as the goddess of love. At her annual festival several hundred thousand persons, including the fairest maidens of Egypt, are said to have paid their devotion at the shrine. Herodotus gives a piquant account of the ceremonies with which the young ladies testified their reverence for their deity.

A gradual accumulation of debris has buried all these famous edifices several feet underground. To get at the rooms in the ancient buildings, shafts must be sunk and levels run at intervals. This renders the work of exploration difficult. But it has had the advantage of preserving the relics of antiquity in good shape. In the mortuary chambers of these old Pharaohs pictures are found with the outlines as sharp and the colors as vivid as if they had been laid on yesterday. To Egyptologists the characters on the scrolls are perfectly legible. The face of Rameses II now at Boulak is in perfect preservation. The only change produced by his thousands of years of rest is a slight indentation on his nose, caused by the tightness of the bandage in which he was swathed.

PROGRESS IN THE APPLICATION OF ELECTRICITY.—Little was added to our knowledge of electricity during 1887, but there was a remarkable development of its practical applications. One of the most important scientific discoveries was that sparks in tubes dissociated iodine, bromine and chlorine. Immense improvements have been made in the construction of dynamos, motors, accumulators and secondary generators, and in consequence the electric lighting and working of railroads and tramways has entered upon a commercial and useful stage. The application of powerful electric currents to smelting, as in the Cowles process for producing aluminum, and to welding, as proposed by Elihu Thomson, is gaining rapid progress, while the use of enormous dynamos for the deposition of pure copper from impure ores is gaining ground with giant strides. The application of electricity to propelling cars on city railways is becoming quite general. Extended trials of the method of employing secondary batteries carried upon the car, to actuate the electric motor, have been made in New York, Philadelphia and other cities, and with satisfactory results. The mode of gearing the motor to the axle of the car is now recognized as an element of the greatest importance, and the relative merits of steel spiral cords, chain-

gearing, conical disks, spar-gearing, friction gear, etc., are being discussed and experimented upon. Several ingenious methods for avoiding the use of a slotted conduit in connection with electric railways and employing continuous conductors have been proposed. There are now no less than 13 electric railways running in the United States and one in Canada, as follows: Appleton, Wis.; Baltimore, Md.; Denver, Col.; Binghamton, N. Y.; Detroit, Michigan (two roads); Gratiot, Mich.; Kansas City, Mo.; Lima, Ohio; Los Angeles, Cal.; Montgomery, Ala.; Port Huron, Mich.; Scranton, Pa., in the United States, and Windsor, Canada. In addition to those already in operation, there are seven in process of completion or started within a few months in the United States and one in Canada.

The Nature Created by Science.

But, a little later, that growth of knowledge beyond imaginable utilitarian ends, which is the condition precedent of its practical utility, began to produce some effect upon practical life; and the operation of that part of Nature we call human upon the rest began to create, not "new nature," in Bacon's sense, but a new Nature, the existence of which is dependent upon man's efforts, which is subservient to their wants, and which would disappear if man's shaping and guiding hand were withdrawn. Every mechanical artifice, every chemically pure substance employed in manufacture, every abnormally fertile race of plants, or rapidly growing and fattening breed of animals, is a part of the new Nature created by science. Without it, the most densely populated regions of modern Europe and America must retain their primitive, sparsely inhabited, agricultural or pastoral condition; it is the foundation of our wealth and the condition of our safety from submergence by another flood of barbarous hordes; it is the bond which unites, into a solid political whole, regions larger than any empire of antiquity; it secures us from the recurrence of the pestilences and famines of former times; it is the source of endless comforts and conveniences, which are not mere luxuries, but conduce to physical and moral well-being. During the last 50 years, this new birth of time, this new Nature begotten by science upon fact, has pressed itself daily and hourly upon our attention, and has worked miracles which have modified the whole fashion of our lives.—*Prof. T. H. Huxley.*

CHARACTER OF NITROGEN IN FERTILIZERS. Agriculturists complain of lack of important information in the analysis of fertilizers, in that they do not determine the character of nitrogen. According to the fifth bulletin of the Vermont Agricultural Experiment Station, Prof. Cooke has recognized this want and has been doing some important work in that direct line. He classifies the forms of nitrogen as follows: Nitrogen of ammonia salts; nitrogen of nitrates and organic nitrogen, or that which is in combination with animal or vegetable matter. It is fully time that there should be a recognition of the condition of availability of the nitrogen that is applied as plant food. The ammonia salts and nitrates being soluble in water are immediately available, but the case is different with the organic nitrogen, with the exception of dried blood, which, being of a nature to rapidly decay when subject to heat and moisture, soon yields its nitrogen to growing crops, but hoof and hornmeal, leather waste and similar nitrogenous substances require an indefinite time for decay and consequent availability. It is gratifying to learn that of 30 different fertilizers subject to examination upon this point, 14 show that not less than 80 per cent of the nitrogen is available, while the lowest gives a percentage of available nitrogen of 61 per cent. The highest stands at 89 per cent.

A TRANSPARENT DEPOSIT OF PLATINUM can be obtained by covering the bottom of a glass dish with a mixture of platinic chloride and glycerol. This is evaporated to dryness, and finally washed with alcohol to remove the product of decomposition of the glycerol. The metallic deposit is perfectly transparent, the transmitted light being of a dark blue gray tint. The commercial method of producing platinum mirrors by reducing the chloride with essence of lavender and heating the containing vessel up to the temperature at which the glass softens does not yield a sufficient cohesive product. Transparent layers of platinum and mirror deposits of iron, nickel and cobalt can also be obtained by electrolytic methods. It is noted that the iron mirror rotates the plane of the polarization, the direction of which varies with the direction of the electric current.

SAVING BY THE USE OF GAS-METERS.—The city of Providence, by the free use of water-meters, has reduced the consumption of water to 38.9 gallons, about two-fifths the American average in our cities. The use of meters is secured by making the water rate to those who put them in about two-thirds of what it is to those who use water without a meter. The expense of providing the meters is small and their inspection costs little.

THE SUPPOSED CANALS ON MARS.—The singular "canals" seen on Mars are explained by M. Fizean on the supposition that the planet had glaciers much larger than those of the earth, and with greater crevasses and movements.

GOOD HEALTH.

Absorption Through the Pores of the Skin.

This subject is very little understood or comprehended by mothers and guardians in its true relation for good or evil to the physical system. Many persons apparently realize that our bodies need little support other than what is swallowed through the throat. Good health, a happy disposition, and even moral character, is dependent in a greater or less degree upon outward influences; much foreign substance is taken in and thrown off by the lymphatics and pores of the skin. We may acquire valuable practical knowledge by the study of physiology, learning how the lungs feed the heart with pure blood by breathing in the pure air and throwing off the impure, but fewer older persons properly realize the necessities and the capacity of the skin which covers the whole body. If the entire surface of the body is washed off daily with pure water only, much clogging substance is removed from the pores of the skin, thus giving renewed strength and tone to the skin to perform its functions, while receiving the exhilarating qualities from the atmosphere. When the stomach and bowels are suffering from intense inflammation, and the patient has become reduced from long absence of food, considerable nutriment may be taken into the system or absorbed through the pores of the skin, if frequent bathing is applied with nourishing preparations. A delicate person may receive great benefit by frequent rubbing with different alkaline preparations—oils and alcohol—the latter of which is always most beneficially used in outward applications. Many a dear little baby has been sent from earth to heaven, when attacked by cholera infantum, by being fed on burnt brandy and other stimulants that burn out the delicate tissues of stomach and brain, when, if pure alcohol with milk or oil had been frequently applied to the surface of the body, the little child might have lived to a ripe old age to bless and comfort humanity. It is much the custom in some foreign countries to rub the entire surface of the body with oil to give elasticity to the muscles and smoothness to the skin. A variety of nutritive preparations may be used with great benefit in the daily bath for young, delicate children, as well as for old persons when the vital resources have become depressed and weakened.

THE HABIT OF EATING MORE THAN WE NEED. Growth and waste and repair go on in a nearly uniform way the whole year through, but the amount of food necessary for these operations or purposes is surprisingly small. The generation of bodily heat requires a most variable quantity of food. In winter, with the temperature of the external air at zero, the temperature of the blood in healthy persons is 98.3 degrees, and when the heat of summer drives the mercury of the thermometer near to or above that mark, the blood still registers 98.3 degrees. The marvelous mechanism by which this uniform blood temperature is maintained at all seasons is not necessary to consider, but it must be evident to every one that the force needed to raise the temperature of the whole body to nearly 100 degrees in winter is no longer needed in summer. The total amount of food needed for repair, for growth and for heating, physiology teaches us, is much less than is generally imagined, and it impresses us with the truth of the great surgeon Abernethy's saying that "one-fourth of what we eat keeps us, the other three-fourths we keep at the peril of our lives." In winter we burn up the surplus food with a limited amount of extra exertion. In summer we get rid of it literally at some extra risk to health, and, of course, to life. We cannot burn it. Our vital furnaces are banked and we worry the most important working organs with the extra exertion of removing what would better never have been taken into the stomach.

THE NEED OF ARM EXERCISE.—Walking on an even surface, the only variety of physical exercise which most business and professional men get in town, is well known to be a poor substitute for arm exertion. The reason is partially plain, since walking is almost automatic and involuntary. The walking mechanism is set in motion, as we would turn an hour-glass, and requires little attention, much less volition and separate discharges of force from the brain surface with each muscular contraction, as is the case with the great majority of arm movements. The arm-user is a higher animal than the leg-user. Arm motions are more nearly associated with mental action than leg movements. A man's lower limbs merely carry his higher centers to his food or work. The latter must be executed with his arms and hands. A third way in which arm exercise benefits the organism is through the nervous system. Whether this is due to an increased supply of richer, purer blood, or whether the continual discharge of motor-impulses in some way stores up another variety of force, we do not know. One thing is certain, the victim of neurasthenia is very seldom an individual who daily uses his arms for muscular work; with this, the limit of bodily mental work is seldom reached.—*Popular Science Monthly*.

MEAT AND STRENGTH.—All the heavy work of the world is not done by men who eat meat. The Roman soldiery, who built such wonderful

roads and carried a weight of armor and baggage that would crush the average farmhand, lived on coarse brown bread and sour wine. They were temperate in diet, regular in exercise. The Spanish peasant works every day and dances half the night, yet eats only his black bread, onion and watermelon. The Smyrna porter eats only a little fruit and some olives, yet he walks off with his load of a hundred pounds. The coolie, fed on rice, is more active and can endure more than the negro fed on fat.

TO COOL A ROOM IN HOT WEATHER.—A correspondent of the *London Carpenter and Builder*, gives a very useful hint as to how to make a room tolerably cool during hot weather. The great cause of heat in a room is, of course, the glass, which, under the sun's rays, will become too hot to hear pressing with the fingers. It is shown that those who cannot enjoy the luxury of an outside sun-blind can extemporize a very good substitute by simply lowering the upper half of the window frame and turning the curtain outside. This not only screens the window, but creates a strong draught between the panes and the linen, and thus absolutely makes the glass cold.

SHORT RESTS.—A week or a fortnight of rest from regular employment has become, in the last few years, a regular custom in all cities or towns of large size. The concentration of a whole year's recreation into 7 or 14 days often produces greater fatigue than would continuous labor. To counteract this tendency to make pleasure an actual burden, the movement for early closing and Saturday half-holidays was brought forward. Short rests and often are what is needed for the general public.

MICROBES NOT ALWAYS INJURIOUS.—The idea that all microbes are injurious to health, says the *Sanitary News*, is a very common one, even among those who pose for well-informed persons. The fact is that they are now believed to play a not unimportant part in the process of digestion and the transformation of food into assimilable form.

MEAT AND CANCER.—Refuting the assertion that meat diet causes cancer, Surgeon-Major Handley reports from India that out of 102 operations for cancer performed at Jeypore since 1880, forty-one were on the persons of meat-eaters and 61 on those of strict vegetarians, who had not known the taste of meat from their births.

CATCH HOLD OF THE DUMB-BELLS.—Ten or fifteen minutes' daily practice with light dumb-bells will do more toward warding off colds, rheumatism and other ills to which humanity is heir in this latitude than all the summer resorts and pharmaceutical preparations in the whole country.—*Cincinnati Times Star*.

VACCINATING FOR YELLOW FEVER.—The physicians of Brazil, it is reported, have been in the habit of vaccinating for yellow fever in the same way as those in this country do for smallpox, and it has proved to be a success.

CODLIVER OIL.—It is said that much of the codliver oil of Russia is adulterated with liquid paraffine, in some cases as much as 50 per cent.

USEFUL INFORMATION.

HOW TO GET BAIT WITHOUT GOING INTO CANADIAN PORTS.—A German chemist proposes to construct an apparatus whereby bait and fish may be preserved fresh for an indefinite period. The process consists of placing the fish in a steel barrel filled with an antiseptic solution in the proportion of three per cent of solution and 97 per cent of water. The barrel is then closed by a tight-fitting lid, the air exhausted by a small air pump, water being forced into the barrel at the same time until a pressure of 60 pounds is obtained. This process was patented in Germany over one year ago, and is known as the Roosen process. Samples of the fish preserved in this way for six months are shown, apparently as good in flavor and otherwise as when first caught. The cost of this preservative process is very small. There are seasons on the Atlantic when the school of herring and spawning is enormous, notably last year in Ipswich bay. If these could be preserved and stored, to be drawn on when needed, the issue between the two countries would not be worth wrangling over. It is the intention of the Fish Commission to make a special effort this year to propagate mackerel.

A POSSIBLE DANGER.—"Rough on Rats" has long been recognized as the name of a useful compound of phosphorus, arsenic and other essentials, by means of which the world has been rid of a vast number of rodents and human foals. It has never hitherto been thought necessary to take any especial precautions about placing it where it would do the most good, or in storing the packages away, except to keep it out of the reach of such small numbers of the human, canine and feline races as we particularly cared to keep with us. Now, however, comes forward a correspondent of *Fire and Water* with the query whether this article, into the composition of which phosphorus enters so largely, may not have been accountable for very many of the fires in dwellings, barns, stores and

buildings of like character, the origin of which has been roughly charged to spontaneous combustion or given up as unaccountable. The idea was suggested to him, he says, by an examination which he recently made of a stable greatly infested by rats, and by finding the poison "rough on rats" freely scattered about in every nook and corner of the building, and in such a manner that had the phosphorus in the stuff become ignited in any one of a dozen places, the wooden floors or walls, dry as tinder, would have been in a blaze at once. This is the first time, we think, that the suggestion has been made, but when one comes to think of it, why is it improbable? No sane man would think of leaving ordinary phosphorus lying around loose in rat-holes, among old rags and inflammable rubbish of all kinds, unless he wanted to start a blaze; yet this is just exactly what is being done day after day with this composition by thousands of persons. Of course, it is possible that the proportions of the different ingredients of the mixture may be such as to preclude any danger of spontaneous or accidental ignition, but would it not be well to have the subject thoroughly investigated?

SEAWEED IN PAPER PULP.—It is said that the strength of paper is materially increased by the employment of seaweeds, which firm with water glutinous liquors. Resin soap and aluminous cake or compound may, if thought desirable, be added. It is also claimed that a very bright surface may be given to paper as follows: A very concentrated cold solution of salt is mixed with dextrine, and a thin coating of the fluid laid on the surface of the paper, by means of a broad soft brush. It is then allowed to dry. The most advantageous salts are sulphate of tin, sulphate of magnesia, and acetate of soda. It is necessary for the paper to have first been sized.

A GREAT SUBMARINE CRAFT.—Col. L. E. Wells of Richmond, Va., is taking steps toward having constructed a powerful steel craft for submarine exploration. The vast strength this vessel will possess will render it available also as a ram for purposes of war. A stock company is about being formed, looking to the building and working of this craft. Col. Wells is in correspondence with a Delaware firm regarding the construction of this new type of sea-going boats. There is no doubt as to the success of the enterprise, as a model constructed some time since worked perfectly, both on and under the surface of the water.

THE NEW FRENCH RIFLE is said to be terribly destructive of life. Experiments made upon dead bodies show that the bullets whiz through the bones and pierce them without fracturing, as is done by the bullets of the "Gras rifle." The wounds, if they may be called so, which are inflicted, are small in their punctures, and consequently very dangerous and difficult to heal. Injuries inflicted at short distances are so considerable that, in the opinion of the surgeons, they would be almost incurable. The discharges of the rifle are unaccompanied by smoke, and the reports are comparatively feeble.

TO EFFECTUALLY STOP UP RAT OR SQUIRREL HOLES.—Soak one or more newspapers, knead them into a pulp, dip the pulp in a suitable solution of oxalic acid. While wet, force the pulp into any crevice or hole made by the mice or rats. Result, a designated retreat, with sore snouts and feet, on the part of the would-be intruders. It should be borne in mind, however, that oxalic acid is a deadly poison.

CATTLE PLAQUE FROM BACTERIA.—Dr. Gamalea and his colleagues of the Bacteriological Station at Odessa, Russia, have become convinced that the cattle plague arises from the presence of bacteria, and that the application of the Pasteur system, under slightly altered conditions, would eventually prove efficacious. Experiments that are about to be made are expected to give positive results.

TO KEEP THE BIRDS FROM FRUIT.—Pans of water placed in fruit and berry patches will keep birds from eating the fruit. An English naturalist claims that the reason birds eat cherries and strawberries is because in the blazing heat they get dreadfully thirsty. If the birds can easily get at water they soon leave off taking the fruit. The experiment is certainly worth trying.

STEEL WIRE MATS are a new article in metallurgical industry. They are made from steel wire, with steel frame and steel braces, all perfectly galvanized, and are wear and weather proof, are self-cleaning, require no shaking, and by the slightest scrape, snow, ice, mud, clay, and water are wiped out of sight.

THE MOST POWERFUL ELECTRIC LIGHT IN THE WORLD is at the St. Catherine's lighthouse, on the southern extremity of the Isle of Wight, on the English coast. The carbon pencils are 2½ inches in diameter, the interval between them one-half inch, and the light developed equal to 60,000 candles.

DEMAGNETIZED HIS WATCH.—It is said that a Long Island physician, finding his watch had become magnetized, inclosed it in a cloth bag and buried it in damp earth, where it remained for three days. Upon digging it up he found it completely demagnetized, and it has not since varied one second.

GREAT GUNS.—In a recent debate on the army appropriation bill in the House of Representatives, Mr. Wheeler said: "I am unalterably opposed to a large army, and I do not know a better way to prevent the necessity for an augmentation of our military force—so important to be avoided—than to keep up with the world on the question of material armament. A gun does not eat rations, wear clothes or draw pay, but it is always on hand for duty, and can easily be moved to the place where it is most needed. There are now mounted upon vessels of foreign navies 129 guns which throw a projectile 10 miles and upward, and the caliber of these guns varies from 12 inches to 17 inches, and they throw projectiles which weigh as high as 2000 pounds. It also appears that there are now afloat in foreign navies 66 guns which throw projectiles weighing from 900 to 1250 pounds a distance of at least 9 miles." It is to be regretted Mr. Wheeler did not mention some of the ships that throw projectiles as he states. We fear it will be difficult to find the vessels.—*Scientific American*.

HIGH PRICE OF LUMBER.—There is much complaint in San Bernardino county at the high price of lumber which prevails there. The price is so high that building improvements are seriously interfered with. A prominent investment banker in that city recently said to a newspaper reporter that he entertained no doubt but that the lumber pool was harming the city to an extent that could only be realized by investigation. He understood that lumber was furnished the companies at Eureka and Humboldt at \$12.50 per thousand, while here the prices ranged up to \$42.50. The cost of freighting the lumber there he understood to be very light. Continuing, the gentleman said that the owner of the property on the northwest corner of Fifth and F streets was delaying the erection of a five-story, granite-front, brick building, for the sole reason that he cannot see the economy in building while lumber remains at the present exorbitant figure. San Bernardino architects make similar complaints.

THE SENATE has added an amendment to the Sundry Civil bill appropriating \$250,000 for a survey of the arid region of the West with a view to its ultimate irrigation and habitation. Major Powell, director of the Geological Survey, estimates that this barren region comprises a million square miles, or more than one-fourth of the whole United States and Territories, and that 300,000 square miles can be economically irrigated and made fertile. It is alleged that corporations are now taking possession of the head-waters of streams, and that settlers are obtaining vested rights which will interfere with any comprehensive plan if the survey is longer delayed.

LOST ON THE DESERT.—News comes from Hiko, 65 miles west of Piche, that Scappaturo, reported lost from the Utah Central surveying party, was found at Quartz Springs. When the party left that place coming eastward, Scappaturo walked ahead, and, sitting down under a tree by the roadside, he went to sleep, allowing the wagons to pass unobserved. He awoke bewildered and walked back to the springs, where he remained five days without food. When found, he was digging out a rabbit from a hole in the side of the hill. He was taken to Hiko, where he is now recovering, though he is still somewhat feebly, as a result, probably, of five days' starvation or possibly an stroke.—*Salt Lake Tribune*.

A SPANISH FLOATING EXPOSITION.—It is reported that a floating commercial exposition is being prepared in Spain for carrying specimens of Spanish manufactures to the principal ports of South America. The Conde de Villana is the name of the ship which is being fitted up as a sort of marine commercial museum. This ship will take the first installment of its cargo at Barcelona, and after proceeding to the other Spanish ports for the same purpose, will set sail for South America. The object of the floating exposition is to secure new markets, to prevent the pirating of Spanish trade-marks, and to put a stop to Spain's paying tribute to England in the share of exchange in her trade with South America.

THE TRUCKEE REPUBLICAN says: "James McDonald told a reporter the ice shipments were immense. Boca is supplying most of the ice now, the houses at Martis Creek and Caba being empty. About 3000 tons have been shipped from Prosser Creek. As soon as the Boca houses are empty the Prosser Creek Co. will supply the market. There will be about 8000 tons of ice carried over for next year, was Mr. McDonald's statement. The shipments are exceeding those of last year and anticipating another increase next season. The Boca Ice Co. is erecting another house with a storage capacity of 8000 tons."

A MECHANICAL SCARECROW has been invented. This new invention represents a man of "sportsmanlike" appearance, standing with gun in hand, ready to fire at the first intruder. The arm holding the gun is made to move by clockwork, which is inclosed in a strong iron box at its feet, and at a proper elevation it fires a shot louder than an ordinary gun. After the report the arm lowers. The mechanism can be regulated at the owner's pleasure by a regulator like a clock, and only requires to be wound up once a day.



A. T. DEWEY.

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SAN FRANCISCO

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TABLE OF CONTENTS.

EDITORIALS.—"Westward the Star of Empire Takes its Way"; An Improved Mining Hoist; Work at the Mining Bureau, 153. Passing Events; Where Many of Our Youth Should Look for Employment; Chronology of the Marshall Sutter Gold Find, 160. Rules for Blasting; Increasing Importance of Silver; Wood Pavement in Europe, 161. A Gun to Shoot Twenty-five Miles; "Hazing" That is Always the Way; Decline of the K. of L.; Wine and Raisin Product of 1883, 158.

ILLUSTRATIONS.—Improved Mining Hoist Manufactured by the Fulton Iron Works, 153.

MISCELLANEOUS.—The Russell Process, 154. The Remarkable Colliery in Japan; Englishmen and Petroleum; Improved Ten-inch Four-Sided Molder, 155.

MECHANICAL PROGRESS.—Construction of Steam Cylinders; Extending and Improving Blast Furnaces; The Locomotive Engineer; A New Steel Casting Process; New Shaping Tool; Heavy Rails; Preventing Accidents from Machinery; Shipping Aluminum to England, 159.

SCIENTIFIC PROGRESS.—A Visit to the Past; Progress in the Application of Electricity; The Nature Created by Science; Character of Nitrogen in Fertilizers; Saving by the Use of Gas Meters; The Supposed Canals of Mars, 158.

GOOD HEALTH.—Absorption Through the Pores of the Skin; The Habit of Eating more than we Need; The Need of Arm Exercise; Meat and Strength; To Cool a Room in Hot Weather; Short Rests; Microbes Not Always Injurious; Meat and Cancer; Catch Hold of the Dumb Bells; Vaccinating for Yellow Fever; Codliver Oil, 159.

USEFUL INFORMATION.—How to Get Bait Without Going into Canadian Ports; A Possible Danger; Seaweed in Paper Pulp; A Great Submarine Craft; The New French Rifle; To Effectually Stop Up Rat or Squirrel Holes; Cattle Plague from Bacteria; To Keep the Birds from Fruit; Demagnetized His Watch; Great Guns, 159.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 160-61. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 164.

OUR LUMBER INTERESTS.—Forestry Experiments in New England; The Duty on Lumber; Shingles Short in Number; Etc., 174.

THE BUILDER.—The Philosophy of Architecture; To Finish a Brick Wall; Fire-proof Building Material; Steel Plates for Houses; Building in the City, 174.

STEAM BOILER NOTES.—Progress in Steam Boiler Manufacture; Compound Engines; Strange Things About Steam; Steam Jacketing; Stop Valves; Defect in Boiler Tubes; Time to Quit; High-Speed Engines, 174, 175.

SHOP NOTES.—The Purchase and Use of Pulleys; The Safety Limit for Belting; How to Dispose of Old Tools; Cleaning Greasy Machinery; Shop Dust; Crap-ite in Making up Joints; For Sharpening Tools; The Tendency to Use Too Narrow Bits; To Keep Machinery from Rusting; To Solve a Joint, 174.

FLOUR MILL NOTES.—A Southern California Wheat Ranch; Milling Power; "Fancy Milling"; First American Mill in New Zealand; European Wheat; Wheat Burned, 172-73.

COTTON AND WOOL.—Manufacture of Cotton Fiber; The Cotton Corner; Substitution of Mulberry Fiber for Cotton; Mysterious Origin of Fires in Cotton; Utah Wool Mills; Wool Scouring Works for Denver; A Manufacturer's Opinion; The Sheep Interest in Oregon; Wool in Australia, 173.

Business Announcements.

[NEW THIS ISSUE.]

Assessment Notice—Gray Eagle M. Co.
Graphite Mine Wanted—Pasadena M. & D. Co.

See Advertising Columns.

Passing Events.

The dry, hot weather continues, and in some localities has been intensified, causing an entire drying up of the springs and streams to the great detriment of the millmen and stock-raisers. The present drouth is reported more severe in some parts of the mining regions than ever before. *Per contra*, they have at some points in Arizona had an excess of rain, the

water falling in such torrents as to cause no little inconvenience and some damage.

In California the rivers have fallen to an unusually low stage, causing a shortage of water to the hydraulic miners, but greatly favoring those engaged in river-bed operations, some of which are proving successful beyond precedent.

To the 500 idle miners on the Comstock, another hundred has lately been added at Seligman, Central Nevada, with smaller complements in other camps in that part of the State, the water famine being the principal cause of so many miners being out of employment.

Were not this department confined strictly to mining matters, it might here be remarked that the county fairs are now in full blast all over the State, with many large squashes and much of horse-racing, but a reported falling off in the other forms of gambling.

Where Many of Our Youth Should Look for Employment.

We had last week something to say in these columns about the importance of providing suitable work for the oncoming generation. For want of space we did not then sufficiently enlarge upon the value of our mines as a suitable field for the employment of this class of our population. In the much attention that is being paid to agricultural pursuits, and in the preference shown by our young men for the so-called learned professions, there is a danger that our mineral resources as a means of affording suitable and profitable employment for the young will be undervalued if not wholly overlooked. That this is likely to happen is denoted by the extent to which the mining industry has come to be ignored by the newspaper press of the country. There is not a paper issued in this city, nor yet anywhere in the State, but devotes twice as much space to horse-racing as to the subject of mining. Even the contents of the baseball clubs are more written about than the gold mines. And yet the latter offer better opportunities for the young man to make a fortune than farming or either of the learned professions—immeasurably better than jockeying, ball-playing, or other fashionable diversion.

It has come to be altogether too much the fashion to regard our gold mines as exhausted, and mining as a dead industry in California. In the popular mind the business has been relegated to the dim and distant past. By the majority it is regarded as a sort of hy-play, being enacted somewhere in the mountains, they don't know just where. There is a tradition that it once reached here very respectable proportions, but they cannot vouch for its authenticity. To such a lowly estate has this grand and beneficent industry fallen in the estimation of the ill informed.

Look the world over, search through all lands, and where shall we find another pursuit that pays like gold mining in this State? There is none. Nor is the field narrow or by any means fully occupied. The area of our auriferous territory is vast and much of it still vacant, and for going out into this rich and illimitable domain it is time we should be fitting great numbers of our youth, providing for them such elementary instruction as will prepare them for engaging in the business of mining to advantage.

Already efforts are being made by communities possessing not a tithe of our mineral wealth to establish institutions for preparing the young for successful miners, that end being in some cases reached through the common schools. In Australia a movement of this kind some time since set on foot has been attended with the most happy results, the effort there including a school for the instruction of prospectors and adult miners as well as the youthful population. With us the plan should be engrafted on the common-school system, with provision for instructing pupils who intend to become miners in the branches especially adapted to fit them for that business, such as geology and mineralogy, with specimens of earths, rocks, ores, etc., illustrative of the subject. Here the rudiments of metallurgy and assaying with the use of the blow-pipe should be taught, together with the application of those simpler tests to which the prospector may have recourse for the determination of minerals. The mode of occurrence of metals and minerals in veins and other forms of deposits might be pointed out—also the best methods for searching after and exploiting the same. With the composition and use of explosives, the employ-

ment of power drills, pumps and other mechanisms and appliances used in mining, the pupil might be so familiarized that he would, when he came to enter the field, find their practical application comparatively easy.

Measures for securing the objects here indicated and for otherwise aiding and encouraging of boys and young men to fit themselves for miners should at once be taken by those who take an interest in the welfare of this class or have the good of the commonwealth at heart. The professions, legal, medical, educational and clerical, are already full to excess. To rear a boy for either of these callings so ill paid and overcrowded where there is open to him a life of sure rewards and manly independence is little short of criminal. Turning to mercantile, manufacturing and mechanical pursuits, the outlook is not much better, nor does even the life of the honest Granger with its anxieties, its uncertainties and its drudgery offer to the young man much that is more inviting.

Was ever such fatuity shown as this deep concern for the future of the young coupled with so much of indifference to the best opening extant for their profitable employment? We know how fierce is the competition that makes success all but impossible in every other line of business, and affect to deplore the absence of industries suitable for our boys, and yet fail to make available these resources so close at hand and so well adapted to supply this much-felt want.

Aside from mere industrial and economic considerations, there are others why our growing young men should be sent to labor in our gold-fields. Mining is a pursuit well suited to develop a sturdy and manly character, no calling having a tendency to bring into play the better impulses of our kind. There is nowhere to be found a more self-reliant, generous or energetic class than the men reared in the mines. Even the wage-earners fail not on occasion to show themselves capable of the most daring and heroic acts. Their self-abnegation and indifference to danger in the hour of extreme peril does honor not only to the guild, but to human nature itself.

There is in these lackadaisical times—these days of dolls, dudes and men-milliners—such fearful and growing dearth of genuine manhood as threatens, unless arrested, the early extinction of all that goes to form a brave and hardy race. As the merchant marine has proved a good school for producing efficient sailors, so may the mines be made a grand nursery for rearing brave men and model citizens.

RUSSIAN OIL WELLS.—The output of Russian oil wells exceeds anything yet produced in the United States. The flow from a single well at Baku has averaged 32,000 gallons per day for 12 years, and the flow has not diminished. There is a large number of other wells which yield nearly as much and some of them more than this. One exceeds it in present flow. It has yielded 40,000 gallons per day for six years. Another well has the following record: For 43 days it yielded 850,000 gallons per day; for 30 days the yield was 225,000 gallons per day; for 11 days the yield was 180,000 per day. This well, after yielding 125,000,000 gallons (500,000 tons) in 115 days, was plugged, and its supply stopped for future use. Five hundred wells have been sunk in the Baku districts, two hundred of which, irrespective of the enormous fountains, are now producing 500,000,000 gallons of oil every year, and American operators believe that this flow could be increased ten-fold. The Rothschilds are said to control a large percentage of the producing and refining business.

The Sacramento Record-Union of August 29th says: George Hofmeister, one of the Commissioners of the Marshall monument, visited Coloma one day last week. He says the foundation is nearly completed, and the work is progressing finely. They will commence putting up the granite column this week.

In the old Perehaker claim at Magalla, Butte county, a drift has been run into an ancient river-bed that has free gold as coarse as gooseberries.

Several oil companies have been organized in Wyoming. That is the coming oil paradise. The surface prospects astound old Pennsylvania oil experts.

Chronology of the Marshall-Sutter Gold Find.

Touching the discovery of gold in California, there has appeared from time to time more than one person claiming the honor of that event, or at least seeking to share that honor with Marshall and Sutter. The date of that discovery has not, however, until recently, been called in question, the 19th of January, 1848, as given by Marshall and his associates, having generally been accepted as the day on which the discovery happened.

But now comes Henry W. Bigler and changes the date of that ever-memorable occurrence from the 19th to the 24th day of that month, as established by an entry made in a diary kept by him during a portion of the year 1847-8. Bigler was a member of the Mormon battalion, which enlisted in the service of the United States in Missouri, June, 1846. They were engaged for one year, and were to go to California for the purpose of aiding in the conquest of that country. This battalion, which numbered 500 men, was under the command of Lieut.-Col. Cooke. Passing through the Indian Territory, New Mexico and Arizona, the command entered California early in 1847, crossing the Colorado near the present site of Fort Yuma. The object of this journey to California having been accomplished, the battalion was mustered out at Los Angeles on the 16th day of July of that year. Some of the members after their discharge proceeded at once to Salt Lake, the major part of them either re-enlisting or scattering through the country in search of work.

Bigler going north was employed by Captain Sutter, and on the 27th day of September went with Marshall to assist in putting up the saw-mill at Coloma, and was there when the first piece of gold was picked up, which he says occurred on the 24th day of January, 1848. Now, according to all previous authorities, Sutter, Marshall and Weinmer included, this happened on the 19th day of that month, and not on the 24th, as Bigler has it. This is the first time that the date of this occurrence, as given by Marshall and others present at the time, has been called in question, and it is a little strange that there should appear such a discrepancy in the date given by parties on the ground, their opportunities for fixing it correctly having been, to all appearance, equally good.

As Bigler kept a sort of journal, a thing no one else pretends to have done, it would, at first glance, seem as if his account of the incident would more likely than any other be correct. But this journal was not exactly a diary, the events recorded in it not having been entered day by day, but at irregular intervals, as the following entries made at the time of the gold discovery show:

"January 1, 1848.—All hands worked on the mill-dam, which is built of brush."

"Sunday, January 23d.—We have had much rain of late, and last week we built a cabin near the mill. To-day four of us moved into it."

"January 24th.—This day some kind of metal that looks like gold was found in the tail-race."

"Sunday, January 30th.—Clear, and has been all the week. Our metal has been tried, and proved to be gold. It is thought to be rich. We have picked up more than a hundred dollars' worth last week."

Now it will be seen that these observations are not registered daily, but at irregular and in some instances at long intervals, and it might well have happened that the remark about some kind of metal having been found January 24th, though entered on that day, referred to an event that happened several days before; or, what is more likely, the day here mentioned was that on which Bigler first heard of the gold find, as both Marshall and Weinmer tell us they kept that fact to themselves for some days after it occurred, well knowing that if it got out the men employed on the mill would knock off work and go to gold-digging.

With this explanation, which seems altogether reasonable, it is easy to see how our chronicler came to fall into such chronological error. That Bigler made no willful statement we may well believe, as he was a man of more than average intelligence and undoubted truthfulness. The 19th day of January, 1848, must, we conclude, continue to stand as the anniversary of the grand gold discovery in California, the entry in the Bigler diary to the contrary notwithstanding.

Rules for Blasting.

In recent numbers of the PRESS we have given some extracts and engravings from Drinker's fine work on "Tunneling, Explosive Compounds and Rock Drills," and here continue the subject:

If $a f$ (Fig. 1) represent a hole parallel to the open face $e b$, the line of least resistance, $e d$, will indicate the general throw of the shot. It will not be necessary to bore the hole $a f$ to the depth $e b$, for it may be assumed in most cases that a curve will be found in the general direction $f b$. Similarly we may presume, under favorable circumstances, that the blast will also break in the direction $f g$. The shot $a f$ would have been set very favorably if there ran from g a crack about parallel to the hole, and from b another perpendicular to it.

If, as in Fig. 2, we assume an existing lower cut in the cavity at d , we then might take $b d$ as the line of least resistance, and to obtain a maximum would extend it to three quarters of the depth of the hole—i. e., set the hole still more obliquely than shown in the figure, for in this case the deeper the hole and the more the rock to be blasted bulges, the greater will be the result of the shot.

The shot $a b$ (Fig. 3) may be considered as an unfavorable case, provided the hole cannot be set above a , for now the shot can only break approximately in the line $a b f$, as if the line of least resistance were sought in a line drawn perpendicular to the hole it would be nearly vertical; further, the shot cannot act as far as d (supposing the rock to be solid), for the distance $c d$ is longer than the hole $a b$. A hole set more obliquely at a and bored to a greater depth would be also unfavorable, for the mass of the portion $f d$ would be too thick, and the rock being hollowed at f , a line drawn from f perpendicular to the hole would then repre-

shots should be set perpendicular to the face of the seams.

The portion of the hole holding the powder ($b c$, Fig. 4.) should be located within the whole rock. This rule, of course, only holds in rock where the strata are thicker than the depth of the powder charge in the hole. If the charge intersect a stratification-bed there will, in general, be a waste of force. Therefore a short-

of course, theoretically, and generally practically, the most unfavorably located.

(b) If the strata dip toward the face, hence toward the miner, the breaking-in is started at the roof (Fig. 5). This case is the most favorable one, as the miner may then easily cut the seams perpendicular to the strata, as in Fig. 4, and the drilling is downward.

(c) If the strata dip from the face (Fig. 6)

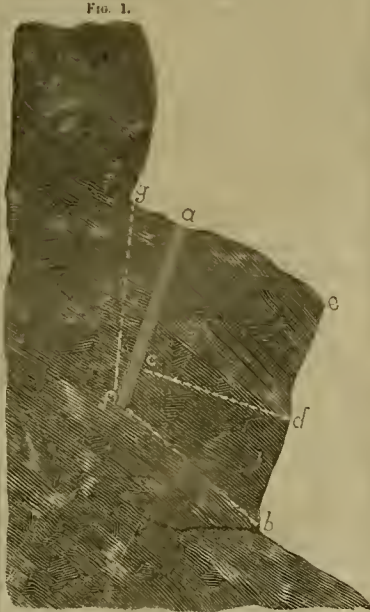


FIG. 1.



FIG. 2.



FIG. 3.



FIG. 4.



FIG. 5.

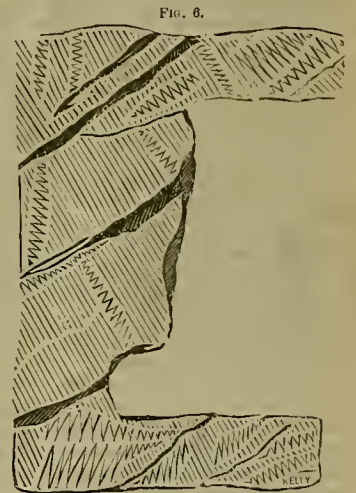


FIG. 6.

LOCATION OF DRILL HOLES FOR BLASTING ROCK.

sent the line of least resistance, and the shot would probably act only to the point f , leaving $f d$ standing. Another very important rule supplementing the preceding one is:

Clefts and fissures and lines of stratification in the rock must be carefully used to advantage.

Such separation faces always represent in a minor sense open or clear faces, and where they exist back of or beyond the hole, we must presume that the shot will act not only outward, but inward, and lines of least resistance will then have to be considered both ways. Fig. 4 may be taken as an example. The shot will probably act beyond the bottom c of the hole, and the distance $c d$ to the next stratification-bed may be taken as the first line of least resistance; and an effect thence toward the exterior (perpendicular to $a c$) may be taken as the second. What in such a case may be estimated as the extreme limit of $c d$ and $d e$ would have to be found by trials. In these cases, of course, the distance $d e$ will be over the average rule of three-quarters $a c$.

When irregular clefts and cross-fissures occur, the question becomes more complicated, and the effect is generally directed to obtaining the largest possible wedges.

In general, we may say, as to blasting in regularly stratified rock, that, in regular seams, the

fissured rock, (i. e., one naturally broken by short clefts, etc.) or one much laminated, though it gives more faces for the powder to act on again, is ultimately less favorable material, in many cases, than more solid material; therefore,

Short-fissured, laminated or slaty rock should not be drilled, if possible, in the direction of the laminae, but, according to the circumstances, in an oblique or normal direction to them.

Should a hole be located in a rock divided into thin laminae, the effect of the shot would possibly only extend to the adjoining beds, and a small wedge might be thrown out; but if the shot be set in a line perpendicular or oblique to the beds, though undoubtedly the charge would be cut by the layers, still a greater effect would probably be obtained. The volume of the blasted body, on an average, is as the cube of the depth of the hole; it is a self-evident deduction that costly preliminary shallow hole work should be avoided as much as possible, and the main masses be thrown by deep-set shots.

Therefore, not only should each shot be set so as to clear a bearing for the following shots, but also, the proper volume should be blasted away.

(a) The first shot at the face of a drift is,

the breaking-in must be started at the bottom, and succeeding shots are drilled either under an angle steeper than the dip of the strata, or if the strata be thick, the shots may be drilled parallel to the stratification beds.

(d) Cases may occur where the breaking in may be located advantageously at the middle of the face.

(e) If the stratification be vertical, and parallel to the line of the drift, the breaking-in is generally made at the side.

Short-fissured or very tough rock requires shallow holes; coarse-fissured, moderately tough rock takes holes of the average depth; and brittle and solid rock works well with deep holes. In tough rock wide holes, and in brittle rock narrow holes, are the more economical. It should be noted that firm, brittle rock may be distinguished by the rebound of the hammer; it drills hard, but breaks easily. Examples are: Trap, granite, gneiss, syenite, etc. Firm, tough rock does not cause the hammer to rebound so violently, leaves a white streak when scratched with steel, drills easy, but breaks hard. Examples are: Limestone, porphyry, quartzose lodes, etc.

In driving a heading, particular care should be taken that unnecessary cost in flushing the clear profile does not arise. Large protuber-

ances and cavities must be avoided, and particular care in this respect should be paid in tunneling—in taking out the bottom of the bench that there be not a large amount of trimming left to be subsequently done in clearing the normal profile, for such work not only is very tedious, causing delay, but is costly. For this reason holes located near the sides or roof should receive especial care.

INCREASING IMPORTANCE OF SILVER—It appears from statistics that but a short time since the seven principal banks of Europe held, in round numbers, \$587,000,000 in gold and the exceedingly large proportionate amount of \$146,000,000 in silver. Omitting the Bank of England, in all the other banks the gold was only \$40,000,000 in excess of the silver. Silver is accumulating in Europe much faster than gold. The Bank of France during the past year has reduced its stock of gold by over \$13,000,000, and increased its silver by nearly \$8,000,000. These facts are of much interest to this coast in showing that silver money is increasing in importance in Europe, while it constitutes one half of the metallic reserves, and probably holds much more than that proportion in the actual metallic circulating medium. The coin balances in the smaller banks throughout Europe would doubtless show a much larger proportion of silver than the large representative banks, as given above. In these figures the single silver standard of Russia is not taken into account. It may be regarded as an enigma which no fellow can find out, or at least as a fact for which no good reason can be given, that the largest silver-producing country in the world should stand out as the most pronounced in its advocacy of gold as against silver.

WOOD PAVEMENTS IN EUROPE.—Wood pavements have met with greater success in Europe

than in America, because they are laid upon a foundation of concrete, and receive more attention in the way of maintenance than is given them here. American yellow pine, owing to its hardness and resinous quality, has been the favorite wood in Berlin and Hamburg. A report from Berlin states that the Frederick's bridge was paved in March, 1879, with yellow pine, and is still in a good condition, while the approaches, paved with granite blocks, have twice since required repaving. The Opera platz in front of the Emperor's palace was paved in 1882 partly with yellow pine and cypress at the point where the traffic is greatest. At other points stone blocks were used, and were laid at the same time. To day the area having the wood pavement is the one which is best preserved. So it seems that Europeans prefer to use wood rather than stone for street pavements even when they have to come to America for it.

REPORTS have been received from the Salmon River, Idaho, mining country, of a valuable discovery of gray copper. One ledge of 18 feet is attracting renewed attention in that district.

NUMEROUS prospectors are hunting ledges along Klamath river, on both sides, especially in the Siskiyou mountain foothills, near the Oregon boundary.

A Gun to Shoot Twenty-five Miles.

The subject of improved explosives and guns still continues to attract much attention in military as well as in other circles. Reference has already been made to large guns that have recently been cast at Pittsburg, calculated for extraordinary work, and we now refer to the character of the explosive to be used, which is known as emmensite.

This explosive appears to be absolutely safe to handle, as will be readily inferred from what follows. It can be used in fire-arms, small or large. It burns slowly when ignited. It can be granulated in any size and is very cheap. At a recent exhibition before a company of experts, near Philadelphia, the inventor crushed a lump of the powder in a stone-crusher. A small cartridge was loaded with the powder, and the hall was shot with a pistol through a one eighth-inch iron plate. Four cartridges, containing in all three pounds of emmensite, were placed in holes four feet deep, drilled into a mass of rock. The cartridges were exploded by electricity, and the rock was broken into pieces small enough to be shoveled away. The amount of broken rock was estimated at 35 tons.

A dynamite cartridge, placed upon a post in a field, exploded when struck by a bullet from a rifle, while an emmensite cartridge was merely knocked from the post. Cartridges of dynamite, explosive gelatine and emmensite were successively exploded on iron plates suspended by threads at the corners. The effect of the emmensite was to blow a large hole through the plate, while the same quantity of the other explosives merely bent the plates.

Trial was then made with Springfield rifles. The distance was 100 yards, and the target consisted of five boards, one-and-three-quarter inches thick, about three inches apart, and backed by an iron plate. With a cartridge containing 70 grains of gunpowder, the ball, which penetrated the farthest, struck the fifth board, while the two emmensite balls, driven by 15 grains of powder, pierced all the boards and were flattened against the iron plate.

The availability of the explosive for submarine blasting was shown by immersing emmensite coated with paraffine in a barrel, and exploding it by electricity. A lump of emmensite, thrown into a barrel of water while burning, continued to burn almost to the last grain. Dr. Emmens exhibited a multi-charge accelerating cartridge of his invention, which may be used in any size of gun.

Dr. Emmens estimates that, with a gun 40 feet long, a range of 27 miles would be obtained. The Pittsburg Steel Casting Company is casting for him a three-inch gun, seven and one-half feet long, which is expected to throw a 25-pound projectile six or seven miles.

"HAZING."—A cotemporary well says: The brutal and cowardly custom of "hazing" as practiced at the Naval Academy has been dealt with exactly right by the authorities. Not only has common decency been outraged, but young men wearing the uniform of the United States have been guilty of conduct, intended to be a practical joke, which was as nasty as it was possible for the dirty minded cads to conceive of, who perpetrated it upon younger cadets whose youth should have protected them from outrage and insult. If the cadets at Annapolis cannot conduct themselves like gentlemen while in the service, they should be made to give way to other young men who have had proper home training and discipline to fit them for reaping the advantages of the education afforded, and are sufficiently well bred to conduct themselves always with propriety. The same may be said of all our colleges where this disgusting custom prevails. The management of our own State University at Berkeley has set a good example, and it has been quietly acquiesced in by the students.

THAT IS ALWAYS THE WAY.—It is turning out to be with natural gas as it is with almost every other natural product. Those who have been able to secure the ground which produces it, and the franchises for piping it into the cities where it is to be used, are beginning to squeeze the people who use it, and measures are being taken to see if there is any relief to be had. In Allegheny, Pa., numerous meetings have been held on the subject, and it is proposed to take the matter into the courts, which looks like a case of locking the stable after the

stealing of the horse. It is said that the Rothschilds have secured a controlling interest in the Russian oil wells, which are already producing more oil than all the wells in this country. All the "big things" of this world seem to be centering into the hands of a favored few.

Decline of the K. of L.

A Pittsburg correspondent of the Boston Herald, of a late date, writes as follows: The coming general assembly of the Knights of Labor is causing considerable conjecture as to whether there has been a large decline in the membership of the Order since the last annual convention. Various reports have been circulated about a decrease in the membership, which have been promptly denied by the representative members of the Order. One of the prominent members, who is well known not only in this city but throughout the country, when asked for as nearly as possible the total membership, said: "It seems incredible, but, if a truthful answer is given, the total membership of the Knights of Labor to-day does not exceed 150,000. The talk of about a half million members or more is a gross exaggeration. I have made it a point to inform myself on this question, and the result is that, as I said, there are not over 150,000 of a total membership in the country. The decline since the last general assembly, a year ago, has been distributed over the entire country.

"Take the Pittsburg district, for instance. A year ago the membership was 11,500, and four delegates were elected to the general assembly. This year only two delegates were chosen, and the total membership has fallen to a trifle over 4000. The same can be said of district and national assemblies throughout the country. Take the celebrated No. 49 of New York, for instance. Its membership has decreased from 81,000 to 10,000. The membership of the Massachusetts Assembly, No. 30, dwindled to such a low figure that, to keep up appearances, they consolidated with another district in that State. It is well known that Cincinnati Assembly, No. 48, from a large membership has dwindled down to about nothing. These are but examples of a decline in membership everywhere. There is another noticeable fact, and that is, that all the delegates that have, thus far, been elected to the General Assembly, are Powderly men. There is also a scheme afloat to inflate different districts, by which they will send more delegates than they are really entitled to. I understand that there is now a movement to inflate District Assembly, No. 3, of this city, by which one more delegate can be elected, making three from here. This was done at the last assembly." Another equally prominent Knight of Labor, when asked about the statement, said he believed it was true that the total membership of the Order did not exceed 150,000. He attributed the great decline to a general apathy of the members. He denied, however, that there had been, or would be, any inflation in the different districts to secure additional delegates favorable to certain leaders in the Order.

FROM the Mountain Echo, Angels, Calaveras county: Most of the mines in the vicinity of Mokelumne Hill have closed down for lack of water. Ore from the Whittle mine, at Albany Flat, is being crushed in the Confidence mill, in this town. The hoisting works at the Utica mine, in this town, are said to be five feet higher than any other works of the kind in the State. The gentlemen composing the English company who have contracted for the purchase of the Stevenot mines at Carson Hill, near this town, arrived in Angels last Monday.

PERSIAN CARPET WEAVING has heretofore been in a large measure a secret. It is now reported that a native of Finland, named Runen, was sent two years ago by the Government to try to discover the art of Persian carpet-weaving. He finally obtained employment in a small factory in Smyrna, where he acquired the desired information and made a design of the loom. A Persian carpet factory has now been established in Finland and great results are expected.

It is said that by a new process aluminum is being produced at Newport, Ky., at a cost of little more than copper. It has heretofore cost \$20,000 per ton to manufacture it. If the news is really true, it means a revolution indeed.

Wine and Raisin Product of 1888.

Clarence J. Wetmore, secretary of the Viticultural Commission, has submitted the reports received by him from different growers in the several wine-producing counties, and they are of great interest to the grower and maker, as they give reliable data to base the estimates of the yield for the year. The damage from frost has been confined to Sonoma county, where it ranged from two to five per cent, the damage from coulure far exceeding it, and being as high as 25 per cent in some localities.

Mr. Wetmore gives a summary of the reports and a few remarks, which are appended below. The yield by counties:

	Gallons.
Napa.....	3,500,000
Sonoma.....	2,750,000
Alameda.....	1,400,000
Contra Costa.....	250,000
Santa Clara.....	2,500,000
Santa Cruz.....	300,000
San Joaquin.....	400,000
Merced.....	30,000
Fresno.....	2,300,000
Los Angeles and South.....	3,500,000
Sacramento and North.....	2,500,000
Other counties.....	1,500,000
Total.....	20,330,000

"Of this amount at least 4,000,000 to 5,000,000 gallons will be distilled, leaving from 16,000,000 to 17,000,000 gallons of sweet and dry wines. The total production as given above may be lessened considerably if the present hot weather keeps up. A great many parties have signified their intention of drying their wine grapes. How much this will reduce the wine yield I am unable to say. The early ripening of the grapes will facilitate the drying of them, and no doubt a great many carloads will be dried. The must-condensing machine at Geyersville, Sonoma county, will also be run again this year, which will help to reduce the wine yield of Sonoma county.

"From the reports received it will be seen that white wine grapes will be short, while red wine grapes will be a good crop, especially Zinfandels. Of table grapes, Muscats and Tokays will not be a heavy crop.

"The reports concerning the raisin production are not full, but from what were received I would place the raisin production at 1,000,000 to 1,100,000 boxes."

"Why Mining has not Quite Kept Up."

EDITORS PRESS.—Your editorial of August 25th, under the above heading, is well worthy of perusal by the entire mining community.

Why mining has not kept up with improvements in other industries is simply because that of all sticklers for old things, the miner excels. Any one presenting a new device or method for reducing, amalgamating or concentrating ores, is derided by his fellow-miners, and at once loses caste as a "practical" miner, and this simply because he presumes to present new ideas. Why, the mechanical and scientific world only move ahead on new ideas.

You say, "It is felt we ought to save the precious metals more closely." Certainly we ought to do so, for the mills in this State do not, on an average, save 40 per cent of the precious metals the ores worked by them are known to contain, and this explains why so many of the mills put up here have proved partial or total failures. It is true some of these mills save as high as 70 per cent of the gold, but where this is the case it is due to the employment of improved modes and mechanisms, chiefly concentrators and amalgamators.

It is time the mining community should give more attention to this matter, and instead of scoffing at, extend aid and encouragement to men of advanced ideas. The least they could do would be to give any device brought to their notice a fair trial. As you say, vast advantages may yet come to this industry through discoveries remaining to be made in electrical as well as in mechanical and metallurgical science. Those interested in mining should therefore wake up, and this industry be forced to keep pace with the advancements made in the other departments of human knowledge and human endeavor.

Could a fair percentage of the gold contained in our ores be saved, this branch of mining, now that labor and all the other factors of production have been so much cheapened, would become not only one of the most extensive, but also one of the best paying industries in the State.

Grass Valley, Cal., Aug. 28. BOSTON.

THE Fulton Iron Works has signed a contract with the San Joaquin Improvement Company for a new stern-wheel boat for the Stockton trade. She will be 205 feet long, with compound condensing engine, high-pressure cylinder 22 inches in diameter, and low-pressure 40, both 8-inch stroke, showing about 600 horse power. The Fulton Works also made a contract with the Wilmington Transportation Company for a new passenger boat to run from Wilmington and San Pedro to the Catalina islands. This will be the fourth boat built by this company for that line.

FLOUR MILL NOTES.

A Southern California Wheat Ranch.

With a view of ascertaining something in relation to the amount and quality of wheat and barley grown, marketed and manufactured in the vicinity of Los Angeles, a Los Angeles Express reporter was recently detailed to call upon Mr. Van Nuys, superintendent of the Los Angeles Fanning and Milling Co. Some samples of white wheat from the firm's San Fernando valley ranches were poured into a small hopper, beneath which hung a pint measure, and when this ran full and was stroked off even, it was suspended to a beam with a sliding weight indicating what proportion this quantity bore to a bushel. The first sample, a good shipping grain, indicated 59½ pounds to the bushel, and the second 61 pounds, the two samples coming from two separate ranches in the valley.

Being asked as to the quality and yield of wheat and barley on the company's ranches, the reply was made that both were good, wheat on one of the company's 2000 acre fields averaging over 31 bushels to the acre, while the entire crop on their 25,000 acres would exceed 25 bushels to the acre, while the weight would average as indicated by the tests first made, some going as high as 62 pounds.

The milling capacity is 400 barrels per day, remarked Mr. Van Nuys, and unless the crop on our ranches should fall short, it would require about all our time to grind what we raise.

A little figuring enabled the reporter to demonstrate that at the rate of product named there would be \$7,500,000 pounds of wheat, which, requiring about 300 pounds to the barrel of flour, would indicate about 125,000 barrels, and this divided by the capacity of the mill—400 barrels per day—would occupy all the working days of the year in grinding up what the company's ranches produce. The reflection was made as to what the ordinary Eastern farmer would think of a report of this kind, and probably remark, on hearing it, that it was "a California lie."

Questioned as to the market for all this flour, reply was given that a large proportion of it was sent to Arizona and Texas, and, owing to the limited acreage sown this year, the demand is about up to the supply, with none left in this county for export.

When asked regarding the barley crop of the company, Mr. Van Nuys said it reached over 60,000 bushels, or 30,000 sacks of from 100 to 105 pounds per sack. The yield would show an average of 40 bushels per acre, a large proportion of which is shipped to Arizona, the price being from 75 to 77½ cents for No. 1 feed per 100 pounds. "To run the company's San Fernando valley ranch," said Mr. Van Nuys, "there are required at this season of the year over 300 men, 600 horses and mules. They also employ quite a number of teams outside in the busy season. In the winter the number of hands is reduced to about 125. In harvest-time we run some 20 heading machines, and the wheat and barley are carried direct to the separators (threshers), of which there are five, run by steam-power. When the day's work is done all the grain that has been cut is found in sacks ready for transportation. There is no time or need for stacking and sweating, as is the practice in the Eastern States."

Flour is made at this mill by a dozen or more patent roller-process machines, while the old-fashioned stone burrs are run on corn, and a separate machine used for rolling barley for horse and cattle feed. A large barley storage and grinding-room has been carried up from two to four stories between the mill proper and the new elevator, which is four stories high and contains 15 compartments. It is the only grain and storage elevator in Southern California, and there is but one other—Starr's, at Port Costa—in the State.

MILLING POWER.—A technical exchange, Power and Transmission, says, in respect to horse-power required for milling: "It ought to take about 40 horse power to make 100 barrels of flour per 24 hours. This, if steam is used, will require the evaporation of from 15 to 40 pounds of water per hour per horse-power, or from 1000 to 1600 pounds of water per hour—say 24,000 to 39,400 pounds of water for the 100 barrels of flour. This will be from 240 to 384 pounds of water per barrel of flour. The boiler will require from one-fifth to one-tenth pound of coal per pound of water, so that if the water required is only 240 pounds per barrel of flour, the coal required may range from 24 pounds up to 48 pounds per barrel of flour. If 384 pounds of water are required per barrel of flour, then the coal required may run from 38.4 pounds per barrel up to 76.8. So you have the extreme of 24 pounds and 76.8 pounds of coal, the maximum being about three times the minimum."

"FANCY MILLING," says the Chronicle, as some flour-millers call their grinding of those food products in which fine white flour has no part, is being carried on in this city to a greater extent than ever before, and the rapidity of the increase in this direction is very marked. There are now made here annually fully 1000 tons of buckwheat and rye flour, 3000 tons of cornmeal and farina, 3500 tons of oatmeal and rolled oats, 1000 tons of cracked wheat, 6000 tons of graham flour, 2000 tons of cracked corn and 600 tons of pearl barley. Local millers who make specialties of this class of products

say that they have no occasion to complain at the state of trade and that there is a good outlook for the future. While bread consumers are not turning in any great numbers from the staff of life, as represented by the wheaten loaf, it is a noticeable fact that the present tendency is toward a heavier consumption of "fancy cereals." The millers now grind out immense quantities of graham flour and oatmeal for the use of the local bakers and cracker-makers, the latter making more oatmeal wafers and fancy graham biscuit than could possibly have found a market here a year ago. It is estimated that there are now nearly 200 men and boys employed in the mills. They receive from \$1.50 to \$5 a day, and are kept steadily at work through the whole year. During the brisk season, which is generally in the winter-time, most of the mills run night and day.

FIRST AMERICAN MILL IN NEW ZEALAND.—Two years ago next October an Auckland miller visited the United States for the purpose of examining the latest and most approved methods for making flour in this country, with the view of securing a new plant for his mill. After making a thorough examination of our system, he invited proposals for what he wanted. The award was made to the Nordyke & Marmon Co. of Indianapolis, Indiana. The contract called for "a 500-barrel roller-mill outfit, the machinery for a 100,000-hushel modern elevator, the total price of the whole, it is said, footing up about \$80,000, the largest foreign purchase ever made in America." The material was shipped by rail to New York, making a special train of 14 cars, thence by steamer to Auckland via England, making a trip of 17,000 miles. That is a long distance to go for what you want, but if you get it there is satisfaction all round. In this case the miller (J. C. Firth) was completely satisfied and discounted his bill in advance of the test allowed. This is the first American flour-mill plant set up in New Zealand, and it is besides the first eight-hour mill in that colony, all the other mills working 12 hours, though eight hours is the rule in other industries there. Mr. Firth works three shifts every 24 hours. There was a streak of irony in this British colony taking this mill and machinery from an interior American shop all the way to England and re-shipping it thence to its destination in New Zealand. It furnishes most telling evidence of the superiority of American machinery over that of a similar class built in England.

EUROPEAN WHEAT.—Telegraphic reports say that Europe will need much more wheat this year than she can produce. There will be a very large deficiency in France, Germany, and in Great Britain. Russia, contrary to the expectations of a few weeks ago, will only produce a good yield. The late cold weather has affected both the amount and quality. The estimated deficiency in France is 156,400,000 bushels, in Great Britain 28,000,000, and in Germany 10,000,000 bushels. India will exceed the yield of 1887 by 20,000,000 bushels, and Russia by 15,000,000. No great demand is expected at once, but higher prices must come.

WHEAT BURNED.—The Los Angeles Express is informed by Mr. Mellus, a grain expert of Los Angeles, that the Laguna ranch, east of Boyle Heights, suffered a loss of some 8000 sacks by fire a short time since. Upon this there was an insurance of \$10 per acre, or about two-thirds the value of the crop destroyed. Mr. Mellus said he had one order from England for 25,000 sacks of red wheat, but knew of none to be had, at least in any quantity.

Exchequer Mining Camp.

EDITORS PRESS:—The outlook at this camp is still improving. The contract let to Batchelder & Johnson by Spawforth & Spencer opening up the Cashier mine 60 feet deeper, has been completed after cutting through a porphyry dyke of 28 feet, when they found a five-foot solid vein of fine-looking ore. The porphyry-dyke feature of the Cashier mine is a striking characteristic of the Exchequer district, and resembles the description of the geology of the Leadville district by your interesting correspondent, W. H. Storme, in the PRESS for Aug. 18th.

The Exchequer district is called a granite formation, although the rock under the microscope resembles quartz, and may be what is termed felsitic; felspar seems to be a large proportion of the mass. It would be an interesting study for a geologist to examine this district.

There seems to be associated with porphyry, porphyry dykes in the basin where the mines are found, and eruptive rocks surrounding the same on all sides.

The owners have shipped a carload of ore from three different inclines, which promise good returns.

Exchequer Camp, San Bernardino Co.

THE boom of immigration and of substantial improvement has struck the whole Puget Sound country, as well as Tacoma and Seattle, and is extending to the towns on the American side of the Straits of Fuca. The establishment of the Gloucester fishermen, who are coming into Port Townsend from the Atlantic side with their fishing smacks, has started a boom in real estate, and the hotels and all available sleeping-rooms are taken up with seekers of bargain in Port Townsend real estate.

COTTON AND WOOL.

Manipulation of Cotton Fiber.

The fiber of the cotton plant, or cotton as it is commercially called, is first presented to most cotton manufacturers after it has been ginned and baled for transportation. The process of ginning is supposed to separate the fiber from the seed and other substances which are foreign to its value as a staple for manufacturing; but the fact that nearly one-tenth of the weight of the contents of a bale of cotton as it is received at the mills is seed, leaf and dirt, shows very plainly that there is room for a great improvement in the process of gathering and ginning. If cotton is in the proper condition when it is baled, it is probable that the process of compressing it into bales as at present accomplished, does not damage it; although it has been claimed that as the fiber is tubular so much compression as is sometimes used must of necessity flatten, and thus injure it. However this may be, cotton compressed in a bale for months cannot be properly worked until it is loosened up; to do this by machinery is very damaging to the quality of the staple and increases the amount of waste; to do it by hand is too expensive. The methods of preparing cotton for the first process of working it in ordinary mills vary somewhat; but in a general way all manufacturers desire to cut the ties or fastenings of the bale, and remove the bagging from the top, several days before it is put on the opener, and either pull the bales apart, and pile or stack them up, mixing the different grades together at the same time, or let them set where the ties are cut to allow the fibers to slowly gain their natural position with reference to each other, and piling them apart but a short time before putting them on the opener. If the first method is adopted, the cotton is taken from the face of the stack, which makes the mixing more intimate still. In the second method, bales of a certain grade may be put through the first process by themselves, and laps from the different grades run together in the succeeding process. One of the conditions necessary to the successful working of the cotton fiber is that it should contain a proper amount of moisture, and if possible neither materially more nor less than the atmosphere in the different rooms through which it must pass in the various processes before it is turned out as cloth.

THE COTTON CORNER.—Late dates from New York report that there is a strong effort being made to break the cotton corner by the importation of cotton from Liverpool. Manipulators have been steadily advancing the price of August cotton for some time, until they had put it up to 11 3/8 cents, or nearly 1 1/2 cents above the price for the following month. The price equated \$7.50 per bale. At this price the bears found it profitable to send to mill-owners and to England for cotton with which to make their deliveries, and a large amount was secured and transhipped to New York. The steamship City of New York brought about 12,000 bales as part of her cargo, and, according to report, there were on the 20th of August 15,000 bales on their way from Liverpool by other steamships, while there was a large quantity in store at Liverpool ready to be returned to this country at once if the high prices for August were continued. With the exception of 20,000 to 30,000 bales which have already been sent from Liverpool, and a few that may be forwarded to New York from New England storehouses, the corner controlled near the close of the month almost the whole stock available for delivery, which is supposed to be about 200,000 bales. The short sales were at that time believed to be anywhere between 200 and 300 and 50,000 bales.

SUBSTITUTION OF MULBERRY FIBER FOR COTTON.—Repeated reference has been made from time to time of the possible substitution of mulberry fiber for cotton. The difficulty encountered has been in the trouble of separating it from the stalk. A French journal has recently called attention to an Italian invention which the promoters claim will revolutionize the fine "tissues" market, i. e., the substitution of mulberry fiber for cotton. It is said that on lifting the bark of the young shoots of mulberry trees a fiber is found which, in fineness and tenacity, is not exceeded by silk, and it remained for an invention to be made for treating the bark and isolating the fiber by a mechanical process. After studies prosecuted at Brescia, two students—the one English, the other Piedmontese—are said to have found a solution, and under their process to produce a very fine fiber, bearing comparison with flax and nearly approaching silk. The name given to the new material is *gelsio lino*, and English houses are already said to have made offers to buy all the available production.

MYSTERIOUS ORIGIN OF FIRES IN COTTON.—Fires in cotton in warehouse and on shipboard are often met with when no apparent cause can be discovered. The following paragraph from a contemporary may explain most of such cases. We believe no reason of a similar cause has ever before been suggested: "Not long ago a lot of Sea-island cotton in bales was discovered to be on fire in a New Jersey warehouse, and when the flames were extinguished in one spot, they would immediately break out in another. An examination showed that it was roller-gin cotton; that is, cotton of which the lint is drawn

away from the seeds by a pair of rollers, set at such a distance apart as to keep the seeds from entering between them, while the fiber passes on and goes into a bag. In the present case, more or less of the seeds had somehow got between the rollers and been crushed, and had thus saturated the cotton with oil, which, in due time, had caused spontaneous combustion."

Utah Woolen-Mills.

There are a number of woolen mills in operation in Utah; one each in Salt Lake, Provo, Springville, West Jordan, Beaver and Washington. That at Salt Lake City manufactures fine woolen dress goods in every variety, choice flannels, linsey sheeting, yarns, etc., and makes a specialty of fine grades of white blankets. There are 60 persons constantly employed at the mill, and 200,000 pounds of wool are used per year. A large proportion of the output is all-wool yarns, for the consumption of which they have a knitting factory in town where they employ 53 hands. The manufactured products of these aggregate in value \$100,000 per year. In quality the goods are all strictly first class and find markets throughout the whole mountain region.

The Provo woolen-mill is a very extensive establishment in which 120 persons are employed; the capacity of the looms is 1000 yards per day and over a ton of wool is required daily. Nothing but the best wool is used about the works. They make a specialty of fine flannels, plain and in all colors and designs of plaid, opera flannels in scarlet and white, also the latest styles of gents' suitings, manufacture hosiery in all colors from strictly pure yarn, and make considerable underwear from their famous seven ounce twilled flannel. They send to Colorado and Montana thousands of dozens of hand-made scarlet and men's gray hose. They have also recently done a large business in Indian robes, which they make gay enough to catch the Indian eye at once. Their carriage robes and blankets find a ready market in Chicago, and their orders for these goods are often fully up to their capacity. Their goods are sold all along the line of the Denver & Rio Grande railroad, and in return they purchase wool from the same districts.

The products of the other mills are chiefly yarns, and are absorbed in their own neighborhood.

WOOL SCOURING WORKS FOR DENVER.—Wool-washing works have lately been started in Denver, Colorado, by O. P. Crawford. Some time ago Mr. Crawford, who is experienced in all branches of the wool business, visited Denver, and saw the opportunity offered to some enterprising man or firm to establish such an industry there. Consequently, notwithstanding the possibility of the water not being of the right quality, he went ahead with his plant. Recently they made their first day's work, and the results were beyond expectation. Ten thousand pounds of wool were scoured in 10 hours, and in a perfect manner. Most of Colorado, Wyoming, Utah, New Mexico and Texas wool is scoured in the East by scouring-mills, and there is no reason why it should not be done at Denver, which is a central point. Mr. Crawford's venture will turn the tide. On account of wool being at such a low price in the East, it behooves wool growers to take advantage of everything which they can possibly find in their favor. This new plant will put many dollars in their purses, and will have a tendency to increase the wool-growing industry. E. Snow & Co. have established a wool warehouse in connection with the scourer, and they will handle the wool, either in the grease or after it is scoured. Growers will be able to get money on their wool from the Denver banks as readily as they could from the Eastern commission houses, and still have their goods under their direct control.

A MANUFACTURER'S OPINION.—Meeting Mr. Torr, of the Petaluma Woolen-Mills, the other day, we naturally inquired as to the business prospect in his line. He stated that the mill was being run to its utmost capacity, and yet the demand for flannels and blankets could not be met. Upon a suggestion that it might pay to increase the capacity of his mill, he said it had been under contemplation to do so, but that the present tariff movement had caused a postponement of the matter for the present. "For," said Mr. Torr, "if wool is put on the free list, then it will only be a question of time as to when woolen goods of foreign manufacture will be admitted free, and when that comes to pass I would not give five cents apiece for woolen-mills in the United States." Mr. Torr is an Englishman by birth and a skilled manufacturer. His opinion on such a subject should outweigh the visionary theories of a thousand impractical demagogues.—*Petaluma Argus*.

THE SHEEP INTEREST IN OREGON.—The Portland, Oregon, *Grocer* says there are 3,000,000 sheep in Oregon. The industry employs or interests 15,000 voters. No matter how these men were divided between parties before the late election, it is safe to say that every one of them felt his personal interest endangered by the Mills-free-wool bill, and that, becoming alarmed, they all rushed to the protection which was most apparent.

WOOL IN AUSTRALIA.—The wool interests of Australia are suffering severely from drouth. The sheep are reported to be dying by millions.

SHOP NOTES.

The Purchase and Use of Pulleys.

To ordinary mortals, says the *Milling Engineer*, a "cat is a cat," and to the average buyer of machinery a pulley is a pulley. Men who have made the feline race a study aver that while a cat may be a cat, there, nevertheless, exists a great difference in cats, and that there are good cats, bad cats and cats of all kinds and condition, including that special cat which each particular man feels called upon frequently to make the target of hoots, jeers, shavings-mug and other throwable articles of his hedonism. So those buyers who have made a study of pulleys and other power-transmitting machinery, aver that there is a great difference in pulleys; that there are pulleys good, bad and indifferent, of all grades—from that which is the pet of the wooden-pulley-millwright up to the perfectly proportioned, smoothly-turned, round and well-balanced pulleys produced by the best makers. There is no doubt that excellence, even in such a small thing as a pulley, costs money and experience to produce, and that perfection in a pulley, as in more important details, is worth money to the buyer. The ordinary buyer, however, hardly ever looks beyond the question of price, and his purchases are made, not with the idea of selecting a perfectly-made pulley, but rather with the view of getting the one which costs the least money. Price, and not quality, governs the purchase, and then the wonder is, why the belts do not run true and why it requires so much power to run the mill. There are establishments devoted to the manufacture of power-transmitting machinery that are using tools ten years behind the times and that make pulleys that weigh one-half more than they should, and millers who buy such pulleys have, in consequence, to use heavier shafts to sustain the extra weight and to furnish extra power to drive them. Competition is keen, and a miller cannot keep up with the procession if his machinery is not of the very best description; and if his engine is an old one and his pulleys heavy hulks of cast-iron, his trial balance will show the result at the end of the year. The policy of buying from price alone is ruining millers all over the country; and it is the "penny-wise and pound-foolish" plan that has only one end.

THE SAFETY LIMIT FOR BELTING.—Those who have the practical management of factories will find the following of value: It is a settled fact in mechanics that no piece of machinery, whether it be a belt, shaft or gear, should ever be submitted to a strain greater than one-half of its breaking strength; it follows that a belt to be lasting and durable should not be submitted to a strain greater than 100 pounds to the square inch in width. It is also an established fact that a leather belt passing over the face of a turned cast-iron pulley embracing one-half of its circumference, will give a fractional force equal to 40 per cent of the stress, so that if a belt one inch wide is passed over the face of an iron pulley embracing one-half of its circumference, and subject to a stress of 100 pounds, the fractional or driving power will be 40 pounds. If this force of 40 pounds be carried forward at a speed of 1000 feet per minute, it is evident that this force will be equal to 40,000 pounds at one foot per minute.—*Tradesman*.

HOW TO DISPOSE OF OLD TOOLS.—There is not a harder problem to deal with in a machine-shop, says the *American Mechanic*, than to decide upon what disposition to make of old tools. Too good to put in the cupola and too poor to use, is a very common condition of such machines as lathes and planers. A new tool does not need to be much better than the old one to make it possible to earn a good deal more with it, so the question of replacing old machines may be made a question of arithmetic. A little figuring in many machine-shops would provide considerable cast-iron for the cupola, and work for tool-builders, to the advantage of all parties. Poor tools at the present day effectually put a shop beyond the possibility of competing with those well equipped. There is no way to successfully compete except to take advantage of the progress made in the construction of machine tools.

CLEANING GREASY MACHINERY.—For cleaning greasy machinery, says the *Milling Engineer*, nothing can be found that is more useful than steam. A steam-hose attached to the boiler can be made to do better work in a few minutes than any one is able to do in hours of close application. The principal advantage of steam are that it will penetrate where an instrument will not enter, and where anything else would be ineffectual to accomplish the desired result. Journal boxes with oil rollers will get filthy in time, and are difficult to clean in the ordinary way; but, if they can be removed, or are in a favorable place so that steam can be used, it is veritable playwork to rid them of any adhering substance. What is especially satisfactory in the use of steam is, that it does not add to the filth. Water and oil spread the foul matter, and thus make more work. It matters not how journal boxes are kept clean, everybody will admit that they should not be allowed to get dirty. They are sure to heat and give trouble, if not cleaned and cared for. Often the oil-tanks are never emptied and the

residuum removed, and, as the pumps draw the oil from the bottom, the machinery is being daily lubricated with impure oil. The oil tank should have a thorough cleaning before new oil is again pumped into it. This is easy enough if the oil is removed, the tank inverted and the steam-nozzle applied to the mouth of the tank. This method of cleaning beats dipping the fifth out with waste. So many opportunities will present themselves when steam will be a valued help to cleaning machinery, if one happens to think of it.

SHOP DUST.—Operatives in wood-working establishments are necessarily subjected to the unpleasant and unwholesome effects of dust, and in planing-mills and similar establishments it seems to be impossible to escape this nuisance. Modern shops are supplied with machines for carrying away much of the dust and shaving made by wood-working machinery, but even in the best-equipped shops the workers are obliged to inhale more dust than is wholesome. Planing mill, sawmill and furniture factory operatives, and, in fact, all men who work in wood, have a peculiar appearance that is the result of inhaling wood dust. An observer would never mistake an old planing mill operator for a worker in a machine shop. Each bears in his face and general appearance the marks of his occupation.

GRAPHITE IN MAKING UP JOINTS.—Few steam-fitters or engineers, says the *Mechanical World*, understand the valuable properties of graphite in making up joints; this valuable mineral cannot be overestimated in this connection. Indestructible under all changes of temperature, a perfect lubricant, and an anti-rustifier, any joint can be made up perfectly tight with it, and can be taken apart years after as easy as put together. Rubber or metal gaskets, when previously smeared with it, will last almost any length of time, and will leave the surface perfectly clean and bright. Few engineers put to sea without a good supply of this valuable mineral, while it seems to be almost overlooked on shore.

FOR SHARPENING TOOLS.—It has often been said, of late, that glycerine is much better than oil for sharpening tools; but the fact that it should be mixed with a small quantity of oil is not as often heard of. The proportions of the composition should be made according to the class of tools to be sharpened. Oils with a relatively large surface is best sharpened with a clear fluid, three parts of glycerine being mixed with one part of spirits. A graver, having a small cutting surface, only requires a small pressure on the stone; in such cases, mix the glycerine with only two or three drops of spirits.

THE TENDENCY TO USE TOO NARROW BELTS. There is a tendency among machine builders to use pulleys that are too narrow for the belts to drive with, for the reason, perhaps, that a wide-face pulley will give the impression that a large amount of power is required to make them operate; so narrow belts are prepared with the idea that they can be laced up till the machine is set in motion. It would take a great deal of the load from the bearings if the wide belts could be used, that they may not be strained all out of shape in transmitting power to the driving-shaft.

ADVANTAGES OF A TOOLROOM.—It has been thoroughly demonstrated that in all large shops the loss of time of the workmen in hunting up tools and putting them into proper condition when injured or spoiled by some unknown other person who had them before, was very much more than the cost of fitting and maintaining a toolroom with all its paraphernalia. Small shops should have, at least, a place for tools; and every tool should always be kept in place.

TO KEEP MACHINERY FROM RUSTING.—In order to keep machinery from rusting, take one ounce of camphor, dissolving it in one pound of melted lard; take off the scum and mix in as much fine black lead as will give it iron color. Clean the machinery and smear it with this mixture. After 24 hours, rub clean with soft linen cloth. It will keep clean for months under ordinary circumstances.

TO SOLDER A JOINT that is to be carefully united, the surface must be nicely fitted with a file and then cleaned thoroughly before bringing the parts together. A piece of tinfoil will occupy a small space and cover the whole surface, and when the work is heated slowly in a fire, the parts can be united so nicely that the joint will be almost invisible.

A CONTRACT has been signed by the Moss Bay Iron and Nail Company of America and the Seattle, Lake Shore and Eastern Railway Company, by which the former company is to manufacture 20,000 tons of steel rails for the latter company, delivery to commence the 1st of next July and to be finished before July 1, 1890. The works of the Moss Bay Company at Kirkland, on Lake Washington, five miles from Seattle, will be put up at once. The works will employ 1000 to 1500 men, and will be the largest west of the Mississippi. Their iron supply is in Snoqualmie pass, about 30 miles from the works.

IN Bombay, India, operatives in cotton and jute mills are paid 12 cents per day.

OUR LUMBER INTERESTS.

Forestry Experiments in New England.

The most profitable system of forestry in New England is said to be that which devotes principal attention to the planting of white pines on the sandy ridges and plains, which are of little value in general agriculture. The sapling pine is the cheapest wood grown at this section, and the most prolific; the earliest grown and the earliest to reach a remunerative and marketable stage. Hard wood makes a growth so slow as to discourage the planter. Whatever theoretical writers on forestry may urge concerning the rapid growth of hard-wood trees on ordinary soil, the actual experience of those who have watched the development of deciduous trees for years proves that all expectations of satisfactory profits are delusive.

A practical New Hampshire lumberman planted some sugar maples under the most favorable conditions on good corn or grain land. They were about an inch in diameter when planted. It is now 30 years since they were planted, and yet they do not average over 16 inches in diameter.

From 1815 to 1820, some six acres on the same farm, which had been cultivated to crops for a few years, was abandoned for cultivation, and the land was soon covered with a thick, thrifty growth of white pine, self-seeded. From 1860 to 1865 and afterward thinnings were made of trees for aqueduct logs and other purposes. In 1880 the pines were all cut off and sold for market, fetching about \$6 per 1000 feet on the stump, and yielding, say 20,000 feet average to the acre on a money value per acre of \$120. These pines were rather coarse saplings, many of them measuring two feet in diameter at the butt. The same land was self-seeded to white pine again, which is coming up thick and thrifty. Adjoining the above is another six-acre lot on the same farm, on a little higher and drier ground, carrying a better soil. Between 1800 and 1810, there were cut from this lot many thousand feet of heavy, old-growth pine timber. The land was not cleared for a crop, but permitted to come up almost exclusively to a growth of sugar maples self-seeded. After these maples reached the age and size to admit of tapping for sap, they received some care and thinning out, yet even now, in 1888, they only show a growth of 12 to 15 inches diameter at the butt. No one could claim this growth to be profitable if undertaken as a business. This growth of maples, except some butt cuts, is worthless for sawing into lumber. It is so full of limbs and knots as to be only fit for wood worth on the stump \$1 per cord. The growth would probably cut 30 cords per acre, and yield its owner \$30 per acre against the \$120 per acre received for the pine on the same farm in 1880.

This account is interesting as showing the pine growth, self-seeded, following the growth of elm and white maple, and again a grove of sugar maples following the old pine. No doubt the last-mentioned land was full of pine-seeds when the old-growth pine trees were cut and removed, but probably the one kind of growth continued for many years had exhausted the soil of the particular plant food demanded in any subsequent growth of pine. Hence the maples germinated, grew and covered the ground.

Considering the time and expense necessary in producing the magnificent hard woods now standing in many sections of New England, this variety of lumber, through lack of appreciation and excessive supply, has never commanded its true value. Our hard-wood forests are sufficiently extensive to supply present demands for many years; but their renewal in future times will prove them less profitable and less prolific than the white pine, which finds so congenial a soil and climate in many sections of New England.

ALL the cedar-shingle manufacturers of Washington Territory held a meeting recently and organized a shingle trust, known as the North Pacific Shingle Manufacturers' Association, with Wm. Page, of Tacoma, as president; Geo. E. Atkinson, of the Pacific Mill Company, as vice-president, and Jos. M. Blaine, of the Tacoma Cedar Company, as secretary. The meeting developed the remarkable fact that this association will combine the interests of some 50 shingle-mills. A trust, similar to the great lumber trust of San Francisco, will be organized with a view to more successfully controlling the prices and quality of the immense quantities of cedar shingles now being shipped East. Representatives were present from the south as far as the Columbia river and as far north as the Skagit river. The association will embrace all the territory north of the "Redwood line" in California.

THE Sisson Lumber Co. has, during the past month, shipped to points in Southern California and Texas, 10,000 cedar telegraph poles. A curious feature of this traffic is the fact that telegraph poles are also shipped from southern points in this direction to be used north of us. It is difficult to understand what conditions would warrant this interchange. —*Sisson Herald*.

MR. C. LONEY has been recently engaged in building sawmills and setting machinery for the Pacific Lumber Co. (the old Burkhalter mill) in place of the plant destroyed by fire a few months ago. The Pacific Lumber Co. has now one of

the complete lumber manufacturing outfit on the Pacific Coast, and everything is working well. The lumber is made near the railroad at Clinton. The logs are brought from the mountain on narrow-gauge railroad cars a distance of seven miles, the railroad outfit belonging to the Pacific Lumber Co., and then the logs are delivered at the sawmill by a shoot or slide that is 1900 feet long.

THE DUTY ON LUMBER.—The Senate Tariff bill, so far as it relates to lumber, would work a great hardship on that industry in the Northwestern States and on the Pacific Coast. Across the border, almost everywhere in the British Dominion, the lumber districts are leased at exceedingly low sums, and if the duty on lumber was lowered, doubtless they would ship their lumber over to our markets and be able to undersell our own lumbermen, and after they succeeded in virtually destroying the business here, they would shove up the prices and control the sale of timber. It is gratifying to know that the entire Pacific delegation is a unit in opposing any such proposition.

SHINGLES SHORT IN NUMBER.—Complaint is made in San Bernardino that many shingles which are sold in that market contain only 200 in number, while they should contain 250. We are not informed where such shingles are put up.

The shingle mill at Olympia, W. T., was destroyed by fire on Aug. 21st. The mill contained 200,000 shingles ready for shipment, and about 20 cords of shingle bolts, all of which were destroyed, as well as all the machinery.

ADVISES from Santa Cruz stated that on the 10th of August there were cut 143,000 feet of lumber in eight hours, from 125 immense logs. This is the greatest known run of a sawmill with a single set of saws.

THE BUILDER.

The Philosophy of Architecture.

Prof. Black recently delivered an address on the above subject before the Edinburgh Architectural Association, from which we collate as follows:

The professor said if houses were to be called architecture, they must have some expression of the eternal principles of beauty according to which the Divine Being had created the universe. Architecture was the poetry of masonry, and masonry meant light and shelter. If architecture was a fine art it was not to be got at by any induction made by any microscopic scientific peeping, analyzing or classifying; but, like poetry and painting, from the inspiration within. The first essential in architecture was order, on account of the idea of practical utility underlying it. Some structures looked like a body squeezed by the wings, or like a congregation of elephants, rhinoceroses and hippopotamuses with their snouts in a manger and their posteriors turned to the golf players in the Links.

The next thing was proportion. Among the elements of the divine perfection which architects, as distinguished from poets, was specially calculated to express were weight, solidity, repose, mass, magnitude, light, elegance, polish, attitude, aspiration, trimness, neatness, comfort, openness and expansion. We should have Scottish architecture as we have Scottish songs. Some buildings expressed the whims of the architect, not the style of the country.

It was out of the nature of things to put a big flat story on the top of an ornamental base, and if the portrait gallery on Queen street were in the New Jerusalem he would condemn it. Attics he detested; there was no such thing as beauty in a sloping roof, and he had nothing but fault to find with the pillars which supported nothing at all. The cause of incongruity in buildings was the absence of a unity of conception in the mind of the architect, the want of what Ruskin called the "lamp of truth," or that consistency of scheme which gave truthfulness to a building. Their whole attitude of mind was of borrowing or stealing, and that was always a dangerous thing.

TO FINISH A BRICK WALL.—To make a good finish of brick front or wall, give it at least one good coat of oil color—two coats will make it more permanent. For the preparatory coat or coats, if the work is to be finished red, use ordinary Venetian red ground in oil; and if an imitation of Milwaukee bricks, use oil white stained with yellow ochre and a little blue, to a shade darker than the finishing color. Having coated your work with oil color, the finishing coat must be "flat" if you wish to imitate bricks. No fear need be entertained that "flattening" will not wear. Care is required in applying the "flattening" to cut in the bricks at the finishing of each stretch to break the joints, so as to prevent glossy spots.

A TEST OF FIREPROOF WIRE LATHING was recently made at Germantown, near Philadelphia, which is referred to by a Philadelphia paper as follows: A substantial two-story brick structure, about 8x12 feet in size, had been erected, with a stout dividing wall in the center, making two compartments. One apartment had its ceiling of wooden lath, nailed to

joists and plastered over, and the other of wire cloth, upon which the plaster had been spread. A hot fire was built in each compartment after everybody interested had an opportunity to inspect the preparations by going up a ladder to the top of the structure, upon which no roof had been placed, the better to subsequently compare results. At the end of ten minutes, when the fire was extinguished, the wooden lathing had burned away, the plaster had fallen into the ashes beneath, and the joists became charred from the flames. In the other compartment, where the wire cloth was used, it and the plaster remained intact at the end of that time, as it did over an hour afterward, when the fire there had been allowed to burn out. The test seemed to meet the general approval of the spectators, who commended the use of the wire lathing in buildings intended to be fireproof, or, at least, slow burning.

FIREPROOF BUILDING MATERIAL.—The *Real Estate Record* says that fire ruins show that porous terra-cotta bricks and blocks best resist fire, water and frost. Next to these in the order of fire-resisting qualities come concrete and burned clay work. In the best work done, the ironwork is incased in porous terra-cotta, tile or brickwork in roof, floor and tile construction. The hollow tiles are faced with vitreous tiles, slabs or any good weather-proof coating, or with a single thickness of brick. Iron and steel framework incased in fireproof materials gives the best possible results. There is a growing preference for light porous walls of hollow material protecting an iron or wooden framework. Massive and heavy walls of brick or stone will do for architecture, but they are not as much of a mechanical necessity as they were regarded a few years ago.

STEEL PLATES FOR HOUSES.—A new system of building houses of steel plates is being introduced by M. Dunly, manager of the Societe des Forges de Chatelansan. It has been found that corrugated sheets, only a millimeter (.0394") in thickness, are sufficiently strong for building houses several stories high, and the material used allows of architectural ornamentation. The plates used are of the finest quality, and as they are galvanized after they have been cut to the size and shapes required, no portion is left exposed to the action of the atmosphere. Houses so constructed are very sanitary, and the necessary ventilating and heating arrangements can readily be carried out.—*Industries*.

BUILDING IN THIS CITY.—In this building line the long list of newly-filed contracts is proof positive of much activity, and there are still contracts to be let for three or four large brick buildings. The Parrott building on the site of the old Jesuit college, the California Electric Light Co.'s works, the Crocker warehouse, the engine-houses for the Omnibus Cable Co., and the new Olympic Club building will all be commenced this fall, and will give employment to hundreds of workmen, while there is every prospect that there will be, at least, the usual number of smaller business buildings and residences.

STEAM BOILER NOTES.

PROGRESS IN STEAM-BOILER MANUFACTURE.—The steam engine, in its original construction, says a contemporary, was in most cases the plain single cylinder expansion engine, using preferably the condenser. The use of the condenser was almost a necessity, owing to the inability of the original boiler to generate steam of any very great pressure, at first of not more than ordinary atmospheric pressure. As the construction of the boiler improved, higher pressures were attained, and increased pressures and power were used and developed in the engine. This increase of pressure progressed until 15 to 20 and 25 pounds per square inch was reached, when another halt took place, due a second time to the inability of the boiler to do better. But improved constructions and thicker plates, together with improved strength in the material, has again placed the boiler fully up to, and, in fact, well beyond, the demands of the engine. At the present time and for some years back there has been no demand made, no matter how high the pressure upon the boilers, that cannot be well met and with positive safety.

COMPOUND ENGINES.—Compounding large steam engines is making decided progress in this country. William Tod & Co., of Youngstown, Ohio, have just shipped the third of 500 horse-power, to the Chicago Arc Light and Power Company, and are now building one of 700 horse-power for the California Electric Light Company of San Francisco. Among recent orders are one 100 horse-power from the Haitnam Steel Company, two of 250 horse-power each from the Kokomo Wood Pulp Company, and one of 750 horse-power from the Westmoreland Paper Company, all compound engines.

STRANGE THINGS ABOUT STEAM.—When water once begins to boil, it is impossible to raise its temperature any higher; all excess of heat is absorbed by the escaping so-called latent heat, and is given out again when it condenses. We often speak of seeing the steam escaping from the spout of a kettle, but this is incorrect; steam is an invisible vapor, and we can no more see it than we can air. What we do see are

the minute drops of water into which the steam condenses on coming into the cool air. If we boil water in a glass flask, we shall notice that nothing can be seen in the interior; and by observing the steam escaping from a kettle, we shall notice that there is quite a distance between the end of the spout and the point where the cloud becomes visible. This cloud of steam is of exactly the same nature as the clouds which float in the sky, and which are formed by the condensation in the cool upper regions of the steam or aqueous vapor present in the air.

IN GENERATING STEAM, experiments under various boilers show 1000 feet of gas to be equal in heating-power to from 80 to 133 pounds of different kinds of coal. One pound of coal equals in value $7\frac{1}{2}$ feet of natural gas. The latter explodes violently when mixed with 9 to 14 parts of air. When burned with pure oxygen the flame temperature of the natural gas is estimated at 7100 degrees centigrade. When burned with just enough air to secure perfect combustion, the temperatures are estimated at 2363 degrees centigrade for natural gas and 1700 for Siemens.

STEAM JACKETING.—The question of the economic value of steam jacketing cylinders appears to be no more nearly settled in Britain than here. The fact seems to be fairly established, that under certain conditions, steam jacketing shows an important gain, while under other conditions there is no gain, but, on the contrary, a loss. The difficulty seems to be in determin-

Coast Industrial Notes.

MR. GRIFFITH is employing 40 men at the Penryn quarry, and 80 at the Rocklin quarry.

THE fires of the Fresno Agricultural Machine Works are run with coal from the mines in the Coast Range, 20 miles from Huron.

LEACH's large planing-mill and the Pioneer Box Co.'s factory at Moore's Station, not far from Marysville, were destroyed by fire Aug. 13th; loss, \$30,000.

THE Mott Water Company (Sbasta county) has built a trestle 87 feet high and 470 feet long across the big canyon, for supporting a 22-inch pipe conducting water to the main reservoir for supplying the town with water.

THE Ranger, which recently returned from a surveying trip along the coast of Lower California, is now alongside the Navy-yard wharf and will probably remain there until November. Considerable repairing will be done to her boilers and engines—in fact \$5000 is needed for the purpose.

THE Oregon Coal and Navigation Co.'s steamer Ajax was launched Aug. 21st, from Boole & Beaton's yard at the foot of Sixth street. The Ajax is intended for the coal trade, and will ply between this port and Coos bay. She is 220 feet in length, 32 feet beam and 16 feet in depth of hold.

THE fruit canneries at Portland, Or., have out signs stating that no more Bartlett pears, plums or prunes can be taken. The canneries

300,000 boxes, being 100,000 more than last year. This shows that the Chinese recognize the absence of profit afforded by our political campaigns.

MESSERS. KENDRICK & GADDIS are busily engaged in constructing the buildings for their new distillery in Nevada county. They have selected a site by a never-failing spring, about a mile southeast from Sims' store at Town Talk. The distillery proper will be 20x20 feet in ground dimensions, the cistern-room, 10x10 feet, and the storeroom, 12x12. The machinery has been ordered from San Francisco.

THE Santa Rosa *R publican* says the woolen-mill at that place has been sold to a company at Oroville, Butte county. Mr. Walker, the secretary of the mill company, says the scarcity of wool in this section of the State and the extra freight charges necessarily involved in securing it make the mill a different institution, financially, from what it was before our sheep ranges were converted into orchards and vineyards.

ORDERS have been sent to Akron, O., for the machinery to be used in the work of the California Vitrified Sewer Pipe Company, now in course of construction near Los Angeles. There has been burned at Elsinore a kiln of 100,000 firebricks to be used in the sewer-pipe kilns. The making of the machinery will be pushed with all possible dispatch, and it will be on hand by the time the building is completed. The Atchison, Topeka & Santa Fe Railroad Co. will build a spur track about eight miles in

will be the first vessel used in the inauguration of an enterprise which the projectors think will revolutionize the coal-carrying trade of the coast. The house which was placed on the old bulk to make her available as a pest-ship will be removed, and the lower masts, which are still in place, will be rigged with fore and aft sails. The boilers and machinery will all be removed, so that the entire hold will be available for stowing cargo. The vessel will be thoroughly braced and bulkheads put in. When all the alterations have been completed the hulk will be taken to Puget Sound in tow of a powerful steam-tug. The owner of the hulk and others are interested in a productive coal mine, the output from which is delivered in the bunkers of the Northern Pacific Railroad Company at Tacoma. The vessel will be loaded with this coal to the extent of her capacity, which will be about 3000 tons. The loaded ship will then be towed back to San Francisco to unload.

IN the large white laundries of this city and Oakland a gradual change has been at work toward the substitution of the female for the male sex. In former years it was not considered possible that girls and women could produce results in the laundrying line that could be as satisfactory to patrons as the work of men. The introduction of the gentler sex into the laundries was at first discouraged as an act of cruelty, as the work was certainly very hard and the duties exacting in the extreme. As improvements were made in the system by which soiled linen was rendered clean and the work became less arduous, the girls were per-



VESSELS LOADING WITH COAL AT TACOMA, W. T.

ing what conditions call for a steam jacket. Further experiments seem to be required.

STOP VALVES.—A correspondent of *Engineering* makes the sensible suggestion that stop valves on marine boilers should be so arranged that they can be closed, in an emergency, from the upper deck. While this has been done in a few instances, as a rule the stop valve on the boiler is so placed that in case of the bursting of the main steam pipe it is impossible to shut off steam, and this has resulted in fatal accidents.

DEFECTIVE BOILER TUBES.—The *Locomotive* offers some good advice in regard to defective boiler tubes. Continual leakage around new tubes, where the boiler is clean and the water is good, generally indicates, it says, something wrong in material or workmanship. Severe expanding of the tubes splits the ends. When this is the case the boiler will always be tender at this point, with a tendency to leak badly.

TIME TO QUIT.—A boiler at the Merton colliery, near Seaham Harbor, Eng., celebrated the completion of the fiftieth year of its service by a pronounced protest against further service. The fireman was killed and others injured. There were no less than 90 small plates in the boiler, and the original thickness of the material was three-eighths of an inch.

HIGH-SPEED ENGINES.—The desire has been expressed that high-speed engines as they are built should have their speed tested by some accurate recording instrument in regard to the regulating of their speed, as it is thought by many that it will be found that they are by no means constant from second to second.

THE Quebrada Copper Mining Company is shipping ore to Battle Mountain, and the *Central Nevada* predicts shareholders will receive a dividend before 12 months.

are running day and night, and have already more fruit than they can dispose of. The fruit crop and grain crop of Oregon are the largest and finest ever known in the history of the State.

THE Santa Barbara *Times* says: Larco & Sons, who man the greater part of the fishing fleet here, report a grand season for mackerel. The fish are like Eastern mackerel when salted and dried, and are now daily hooked in immense numbers. Baracouda, cod and half a dozen other varieties of large fish are also in the market.

THE Iroquois is still in the stone dock at Mare Island, with the repairs to hull and engines nearly completed. It is probable that she will be ready for commission by the 1st of November, as the work on the boilers and the enlargement of the berth deck are well under way. The vessel's frame was found rather more solid than was expected.

THE latest industry added to the list of California's productions is the manufacture of Saratoga chips. In a stall at the Mechanics' Fair appears a splendid display of these edibles, neatly put up in half and quarter pound boxes. A factory has been erected at 623 Geary street, and so large has the demand grown that the product is now about 5000 boxes per week.

ARTICLES incorporating the Skagit Coal and Iron Company were filed at Seattle, W. T., recently. The capital stock is \$1,000,000. The coal on the Skagit river is said to be the finest ever discovered on the Pacific Coast, and the combination of coal and iron lying alongside each other enabled iron and steel to be produced at a minimum of cost. Coke ovens will also be erected at once.

LOCAL manufacturers of costly pyrotechnics are quite busy at present making up large stocks of fireworks for the fall campaign. Presidential years are greatly appreciated by this class of workers. The importation of firecrackers this year, it is stated, will amount to

length from its California Central line to the bed from which the clay for the sewer pipe is to be taken. This bed is near Elsinore. Crude petroleum will be used by the sewer-pipe company in the burning of the clay. About 150 men and boys will be employed at the works.

GRASS VALLEY wants a fruit cannery. The fruit-growing business of this section is largely increasing, the new orchards that have been planted will add largely to the annual crop in a year or two more, and provision must be made for that portion which cannot readily be sold for shipment or local consumption. The fruit-canning business has been found to be profitable wherever started in the State, and the number of such establishments is increasing from year to year. The demand for good canned fruits is practically unlimited, and those of California preparation are already finding a world-wide market.

A DISPATCH from Tacoma, Washington Ter., says: The fishing schooner Oscar and Hettie arrived here yesterday with 150 tons of halibut, which is being packed in refrigerator cars at the wharf, preparatory to being shipped to St. Louis, St. Paul, New York and Boston. The fish are exceptionally fine in quality, and were all caught outside Cape Flattery in three days of this week. Capt. Johnson, the owner, who brought his vessel from Gloucester, Mass., round Cape Horn, expects to be able to make shipments of fresh halibut East every two or three weeks, and to supply the Eastern market with a superior quality of fish at least as cheap as the Gloucester fishermen can. The Northern Pacific railroad has arranged to give special dispatch to fresh halibut and cod shipped. A number of other Gloucester fishermen are expected here shortly with their vessels and tackle, and shipments will be made almost daily to the Eastern markets, soon after their arrival.

THE old Confederate cruiser Shenandoah is to be placed in active service once more, and

mitted by slow degrees to take possession of the big laundries. It was only recently, however, that the largest laundry in the State made the change in the sex of its employees. Now the greater number of persons employed in laundry work in that great cleansing establishment are women and girls. They labor for a less rate of wages than men and do nearly the same amount of work. There are now about 125 white laundries in this city, large and small, and they employ altogether about 1200 men, women, girls and boys. Of Chinese laundries there are about 200, employing nearly 1500 men.

Washington Coal-Fields.

We present on this page an illustration showing the manner of loading vessels with coal at Tacoma, W. T. Tacoma is one of the ports on the sound where a great deal of the coal mined in the tributary regions is loaded into vessels to be transported to San Francisco and other markets. These coal-fields are vast in extent and comparatively inexhaustible. The chief supply-points for Tacoma are South Prairie and Carbonado. From these places the Northern Pacific Co. has built railroad tracks, and hauls the coal in 50-carload trains to the great coal-bunkers of the company on the Tacoma water-front. The track leads by easy grade to immense bins some 50 feet above high water, from whence the coal is dumped by the tens of tons into the holds of vessels lying alongside or beneath. This is a great and growing industry and one which will contribute for generations to the wealth of Western Washington Territory.

NEARLY half a ton of gold bearing quartz has been taken from the Michigan mine at Ishpeming. The week's output was worth \$67,000. Free gold-quartz has also been found in the bottom of the gold shaft of the Lake Superior Iron Co.



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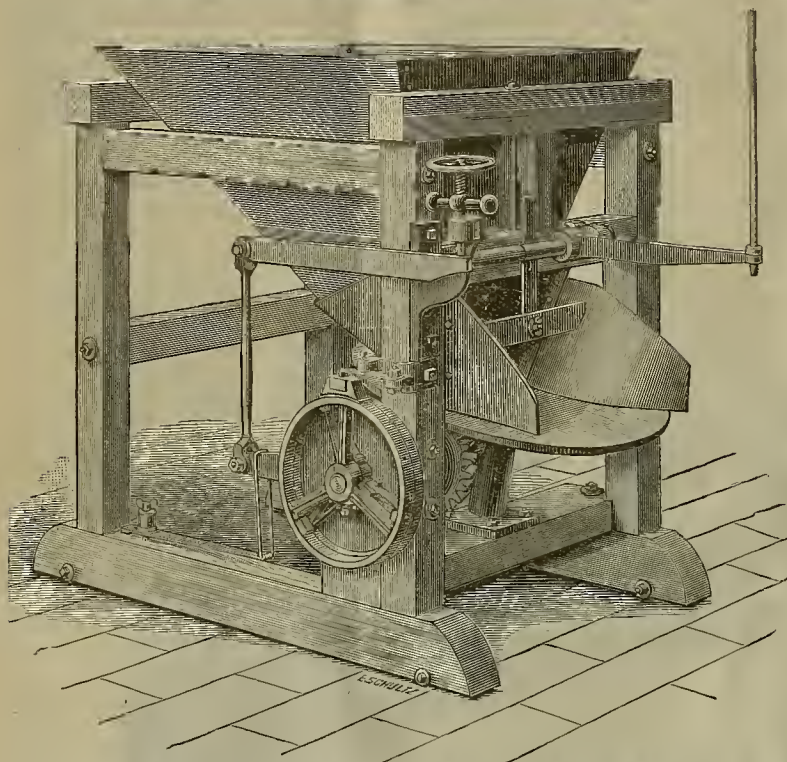
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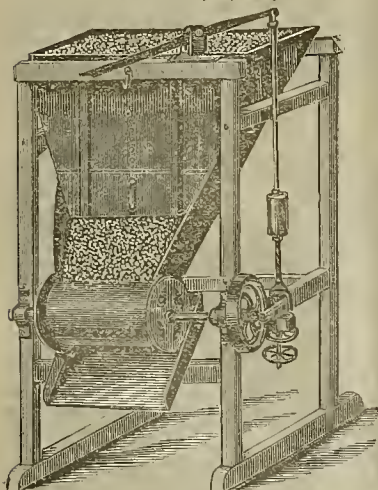
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This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.
In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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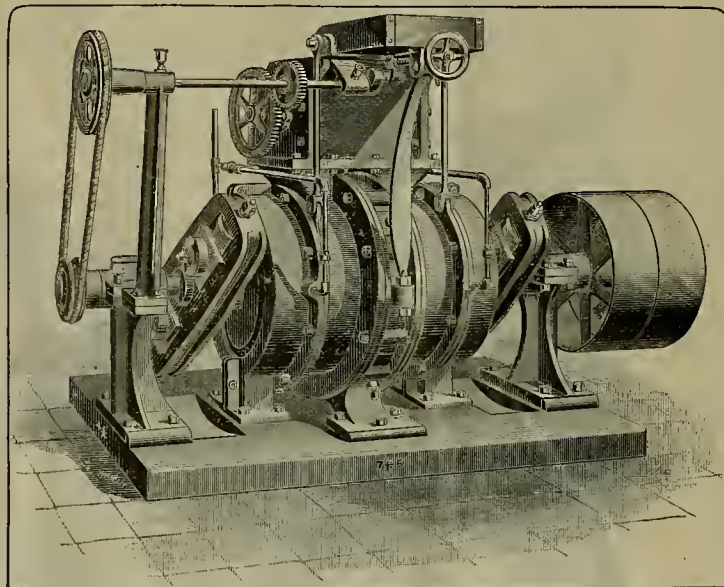
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This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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We are now so situated with our new works as to offer to the miners of the Pacific Coast SMALL AIR-COMPRESSING PLANTS at such prices that almost any small mine can afford to put in power drills if they have none in use.

By our NEW AND PATENTED SYSTEMS (by which the duty or performance of drills is not reduced with use) it is no longer necessary PLANTS IN THIS COUNTRY, and has patterns for all sizes up to 40-inch diameter of cylinder.

In respect to capacity, SPEED OF DRILLING, perhaps it is in order to say that in EVERY AUTHENTIC TEST CONTEST for speed yet initiated, the RAND DRILLS have, without exception, BEEN VICTORIOUS. This fact, coupled with another important one, that the drills use much LESS AIR and cause LESS REPAIRS, has won for them nearly all of the Eastern mining trade, which has kept their works always busy.

Since the reasons which formerly restrained us from the California market no longer exist, we are now in the field for the business.

SPECIAL ATTENTION is called to the latest designed sectional Compressor just built for the Batopilas mine in Mexico, and to the Compound Engine Compressor built for the Anaconda mine in Montana.

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AIR COMPRESSORS &
GENERAL MACHINERY FOR
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QUARRY & RAILROAD WORK.
RAND DRILL CO. 23 PARK PLACE NEW YORK**

to buy a Compressor of double capacity than the drills are expected to require, in order to keep up the supply of air necessary on account of the wear of drills and compressor.

Besides having THE NEWEST AND LIGHTEST designed small drill plants, the Rand Drill Company, as is well known, has built, and is now building, the LARGEST COMPOUND RESSOR

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Is in operation in each
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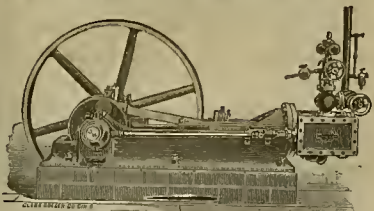
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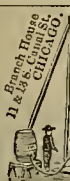
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Mining Share Market.

The movements of the mining share market have, during the past week, been like that of the door on its hinges, going back and forward, but making no progress. If the prices of the "securities" have wobbled enough to allow the brokers and "chippers in" to make cigar money, that is probably all that can be claimed for them.

Notwithstanding this untoward condition of the market, the mine are producing fairly well, the amount of net earnings made, though less in the aggregate than when the Comstock was making its abnormal output of bullion, being fully up to the standard of late years, those earnings being at the same time more widely distributed than was formerly the case. But a stagnant share market and a large bullion production are not in mining affairs a phenomenal condition of things. They very often go together—so often that the existence of the one almost implies the existence of the other. When the mines are making good earnings the insiders manage to depress the prices of shares preliminary to gathering them in.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Mount Diablo, Sept. 1, \$3427 88; Nevada Queen, 2, \$24,000; Eberhardt-Monitor, 3, \$2000; Monitor Belmont, Aug. 31, \$5000.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Sept. 6, 1888.	
ANTIMONY—French Star.	9 @ 91
BORAX—Rehob.	— @ 7
Powdered.	7 @ —
Concentrated.	6 @ —
COPPER—	
Bolt.	26 @ —
Shastahing.	26 @ —
Ingot.	16 @ 90
Fire Box Sheets.	— @ 36
IRON—Glenbrook ton.	— @ 27
Eglington, ton.	— @ 27
American Soft, No. 1, ton.	— @ 31
Oregon Pig, ton.	21 @ 23
Clay Lake White.	— @ 23
Shocks, No. 1.	— @ 23
Ear Iron (base price) @ lb.	21 @ —
LEAD—Fig.	4 97 @ —
Bar.	5 2 @ —
Sheet.	7 @ —
Pipe.	7 @ —
Shot, discount 10% on 500 lbs.	Drop, @ bag.
Buck, @ bag.	1 75 @ —
Chilled, do.	1 95 @ —
STEEL—English, lb.	16 @ 20
Black Diamond tool.	10 @ 16
Pick and Hammer.	8 @ 10
Machinery.	4 @ 5
Toe Calk.	35 @ 40
QUICKSILVER—By the flask.	35 @ 40
Flasks, new.	1 @ 60
Flasks, old.	85 @ —

New York Metal Market.

Telegraphic advices dated Sept. 6th give the following New York prices: BAR SILVER—91 3/4 per oz. BORAX—90. COPPER—LARGE—\$16.90. IRON—No. 1, \$22.00. LEAD—\$4.97 @ —. TIN—\$21.00 @ —. The following is the latest by mail from the "New York Metal Exchange Market Report": COPPER—Steady, spot closing at \$16.70 @ 16.80. Transferable Notices (Lake) issued at \$16.50 @ —. LEAD—Firm, at \$4.81 @ —, spot. Transferable Notices issued at \$ — @ —. TIN—Irregular at \$20.10 @ 21.00. Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extreme of buyers' and sellers' views. All prompt delivery. Australian Tin, @ —; Billion Tin, @ —; Banca Tin, @ —; Baltimore Copper, \$14.75 @ 15.00; Orford Copper, \$16.25 @ 16.25; P. S. C. Copper, @ —; Foreign Lead, \$4.60 @ 4.7; Foreign Spelter, \$5.40 @ 5.50, Antimony, \$9.75 @ 13.50.

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COMPANY.		LOCATION, NO. AM'T. LEVIED, DELINQ'T. SALE.		ASSESSMENTS.		SECRETARY.		PLACE OF BUSINESS.	
Belcher M Co.	Nevada.	35.	50.	July 18.	Aug. 22.	Sept. 12.	J. Crockett.	327 Pine St.	327 Pine St.
Bullion M Co.	Nevada.	34.	50.	Aug. 4.	Sept. 7.	Oct. 24.	R. R. Grayson.	327 Pine St.	327 Pine St.
Baker Divide M Co.	California.	16.	25.	Aug. 13.	Sept. 17.	Oct. 8.	D. M. Kent.	330 Pine St.	330 Pine St.
Chollar M Co.	Nevada.	25.	10.	July 20.	Aug. 23.	Sept. 11.	C. E. Elliott.	309 Montgomery St.	309 Montgomery St.
Champion M Co.	California.	31.	10.	Aug. 8.	Sept. 10.	Sept. 29.	T. Wetzel.	522 Montgomery St.	522 Montgomery St.
Great Western M Co.	California.	1.	10.	July 17.	Aug. 24.	Sept. 14.	H. H. Halsey.	328 Montgomery St.	328 Montgomery St.
Golden Fleets G M Co.	California.	13.	4.00.	July 31.	Sept. 8.	Oct. 1.	W. J. Gleason.	806 Market St.	806 Market St.
Gray Eagle M Co.	California.	9.	50.	Sept. 4.	Oct. 10.	Oct. 30.	O. H. Bogart.	327 Pine St.	327 Pine St.
Keyes S M Co.	Nevada.	2.	50.	July 18.	Aug. 23.	Sept. 23.	M. P. Minor.	328 Montgomery St.	328 Montgomery St.
Locomotive M Co.	Arizona.	3.	15.	Aug. 21.	Sept. 24.	Oct. 15.	A. H. Pish.	309 Montgomery St.	309 Montgomery St.
Lady Washington Con M Co.	Nevada.	7.	25.	Aug. 21.	Sept. 24.	Oct. 16.	L. Osborn.	309 Montgomery St.	309 Montgomery St.
Live Oak D M Co.	California.	10.	05.	Aug. 20.	Sept. 27.	Oct. 19.	J. M. Lizo.	328 Montgomery St.	328 Montgomery St.
Mayflower Gravel Co.	California.	42.	50.	July 31.	Sept. 3.	Sept. 25.	J. Morizo.	328 Montgomery St.	328 Montgomery St.
McLean M Co.	Nevada.	36.	25.	Aug. 9.	Sept. 13.	Oct. 3.	C. E. Elliott.	309 Montgomery St.	309 Montgomery St.
Navajo Queen M Co.	Nevada.	4.	20.	Aug. 3.	Sept. 5.	Sept. 24.	J. F. Holling.	538 Kearny St.	538 Kearny St.
Ophir M Co.	Nevada.	54.	50.	Sept. 1.	Oct. 4.	Oct. 24.	E. B. Holmes.	309 Montgomery St.	309 Montgomery St.
Pondera M Co.	Nevada.	1.	05.	Aug. 10.	Sept. 1.	Oct. 10.	J. Stadfield Jr.	349 Montgomery St.	349 Montgomery St.
Scott Bar M Co.	California.	5.	10.	July 28.	Sept. 3.	Sept. 20.	W. Richardson.	218 California St.	218 California St.
Spring Valley C M Co.	California.	3.	10.	July 19.	Aug. 25.	Sept. 24.	H. Pish.	340 Sansome St.	340 Sansome St.
Savage M Co.	California.	0.	10.	Aug. 3.	Sept. 5.	Sept. 25.	E. B. Holmes.	309 Montgomery St.	309 Montgomery St.
Superior M Co.	New Mexico.	3.	15.	Aug. 15.	Sept. 15.	Oct. 15.	I. C. Stamp.	309 Montgomery St.	309 Montgomery St.
Virginia Creek Hyd M Co.	California.	6.	06.	Aug. 29.	Oct. 9.	Oct. 23.	J. M. Quay.	406 Montgomery St.	406 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Con Excelsior & Cold King M Co.	Nevada.	W. F. Perry.	308 California St.	Annual.	Sept 10
Con Bituminous Rock Co.	Nevada.	W. Beck.	58 Flood Building.	Annual.	Sept 12
Grand Prize M Co.	Nevada.	R. R. Grayson.	327 Pine St.	Annual.	Sept 12
Gray Eagle M Co.	California.	C. W. Rogers.	309 Montgomery St.	Annual.	Sept 19
Mono G M Co.	California.	C. W. Rogers.	309 Montgomery St.	Annual.	Sept 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Sept 11
Con California & Va M Co.	Nevada.	S. M. Croft.	309 Montgomery St.	1.00.	Aug 6
Eureka Con M Co.	Nevada.	H. R. P. Hutton.	306 Pine St.	25.	July 9
Mt Diablo M & M Co.	Nevada.	R. W. Heath.	318 Pine St.	25.	Aug 27
North Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	50.	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50.	July 11
Hale & Norcross S Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50.	Aug 8
Idaho M Co.	California.	J. F. Lightner.	309 Montgomery St.	50.	July 11
Pacific Horn, Salt & Soda Co.	California.	A. H. Clough.	230 Montgomery St.	1.00.	June 10
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	15.	July 12

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 16.	WEEK ENDING Aug. 23.	WEEK ENDING Aug. 30.	WEEK ENDING Sept. 6.
Alpha.	1.25	1.45	1.35	1.50
Alta.	1.05	1.10	1.15	1.30
Ande.	1.70	1.40	1.75	1.40
Argenta.	1.10	1.10	1.10	1.10
Belcher.	2.35	2.95	3.35	3.45
Bodie.	1.25	1.25	1.25	1.25
Bullion.	40	70	45	65
Baltimore.	50	60	50	60
Belle Isle.	30	35	35	45
Bodie Con.	1.25	1.65	1.25	1.45
Boston.	2.00	2.00	2.00	2.00
Bodie Tunnel.	1.00	1.00	1.00	1.00
Bulwer.	50	65	60	65
Con. Va. & Cal.	60	80	70	85
Challenge.	8.00	3.50	3.25	3.00
Champion.	1.75	2.20	1.75	2.35
Chollar.	1.75	2.20	1.75	2.35
Confidences.	9.75	1.31	10.75	10.1
Con. Imperial.	25	35	30	35
Caledonia.	30	35	30	35
Con. Pacific.	30	35	30	35
Oron Point.	2.55	3.4	3.00	3.75
Crocker.	50	90	65	70
Caledonia.	30	35	30	35
Dudley.	30	35	30	35
East E. & B.	30	35	30	35
Eureka Con.	4.00	4.90	4.00	4.90
Excelsior.	70	95	85	100
Grand Prize.	1.05	1.05	1.10	1.30
Gold & Curry.	2.10	2.55	2.35	2.40
Hale & Norcross.	3.75	4.65	4.30	4.85
Holmes.	4.00	4.90	4.00	4.90
Independence.	20	20	20	20
Iowa.	30	30	30	30
Julia.	30	30	30	30
Justice.	60	90	75	120
Kentuck.	2.00	2.40	2.75	2.60
Lady Wash.	25	30	25	35
Live Oak.	75	100	80	110
Mono.	1.75	1.00	1.00	1.15
Mt. Diablo.	2.15	2.70	2.25	3.35
Northern Belle.	1.50	1.50	1.50	1.50
Navajo.	2.25	2.90	2.40	2.60
North Belle Isle.	2.25	2.90	2.40	2.60
Niagara.	4.30	4.80	4.35	4.85
Nev. Queen.	4.30	4.80	4.35	4.85
North O. & C.	1.00	1.15	1.10	1.30
Ocidental.	4.30	5.00	4.35	5.10
Ophir.	4.30	5.00	4.35	5.10
Overman.	1.10	1.40	1.15	1.45
Potosi.	1.50	2.25	2.00	2.65
Perseus.	1.00	1.15	1.05	1.30
Piedmont.	35	40	45	50
P. Sheridan.	30	35	30	40
Silver Star.	1.50	2.30	1.95	2.40
Savage.	1.50	2.30	1.95	2.40
S. B. & M.	2.15	2.50	2.45	2.80
Sierra Nevada.	2.15	2.50	2.45	2.80
Silver Hill.	40	45	40	55
Silver King.	2.35	2.35	2.35	2.35
Scorpion.	50	50	50	50
Syndicate.	05	10	10	15
Union Con.	2.25	2.50	2.40	3.25
Utah.	90	115	90	125
Yellow Jacket.	2.50	3.40	3.20	3.75

Sales at San Francisco Stock Exchange.

WEDNESDAY Sept. 6.		40 Kentuck.		3.00	
300 Alta.	1.65	50 Lady Wash.	20c	20c	20c
100 Ande.	1.00	20 Mexican.	3.10	3.10	3.10
700 Alpha.	1.60	200 Mono.	1.60	1.60	1.60
300 Belcher.	4.50	100 Belle Isle.	2.65	2.65	2.65
120 B. & Belcher.	3.40	410 Overman.	1.55	1.55	1.55
200 Bullion.	1.20	300 Ophir.	5.75	5.75	5.75
150 Bodie.	1.50	600 Occidental Con.	1.25	1.25	1.25
150 Chollar.	2.65	300 Potosi.	2.55	2.55	2.55
200 Con Va. & Cal.	4.25	100 Perseus.	1.30	1.30	1.30
1100 Crown Point.	4.25	100 Savage.	2.65	2.65	2.65
40 Confidence.	1.12	100 S. B. & M.	3.00	3.00	3.00
50 Challenges.	3.75	250 Sierra Nevada.	3.10	3.10	3.10
100 Crocker.	80c	100 Silver Hill.	55c	55c	55c
450 Gold & Curry.	2.65	200 Scorpion.	1.20	1.20	1.20
400 Grand Prize.	75c	300 Union.	3.75	3.75	3.75
250 Hale & Nor.	4.15	300 Utah.	1.25	1.25	1.25
200 Justice.	1.00	250 W. Comstock.	75c	75c	75c
100 Julia.	30c	100 Yellow Jacket.	3.95	3.95	3.95

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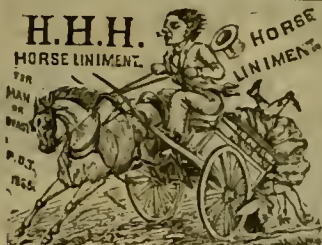
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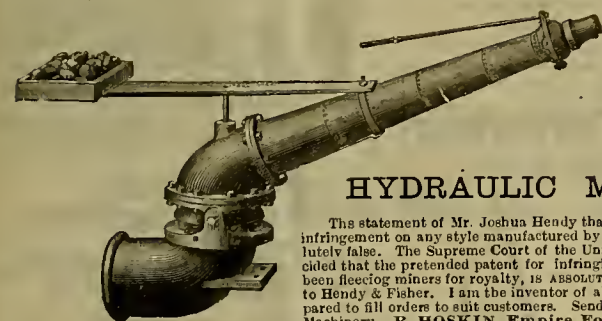
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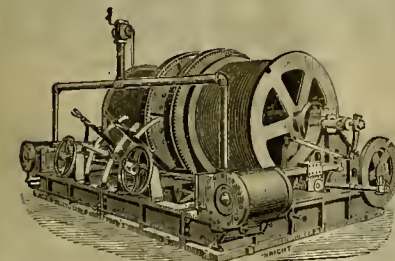
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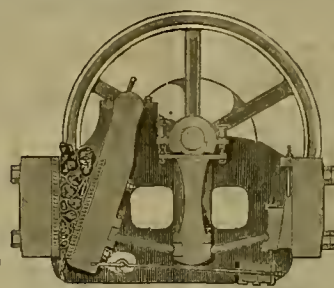
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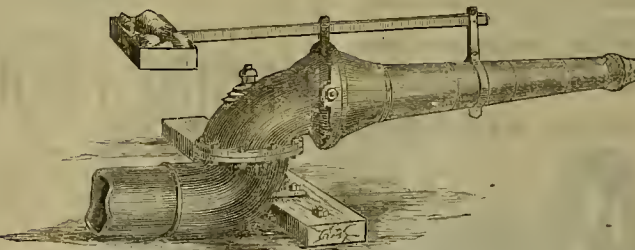
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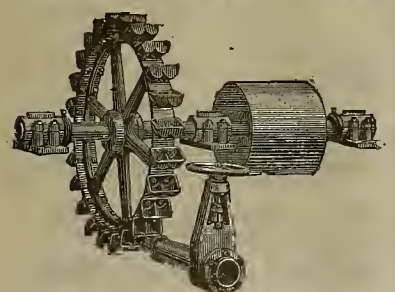
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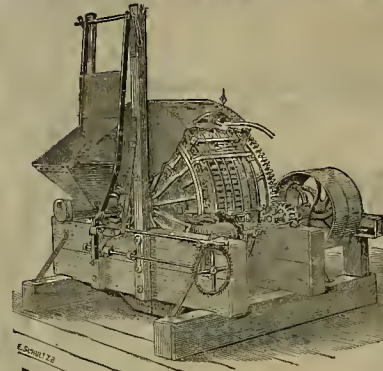
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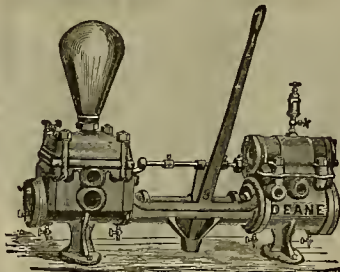
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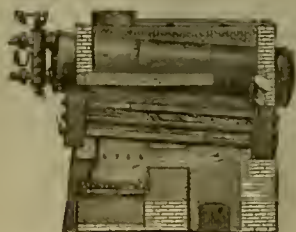
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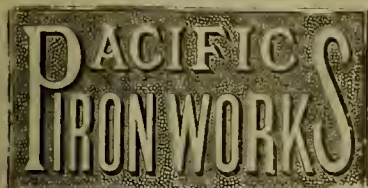
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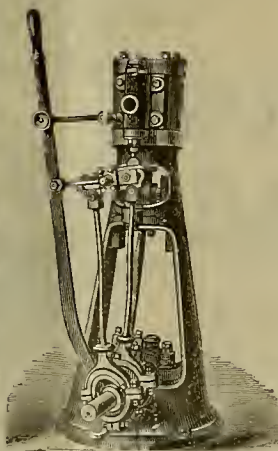
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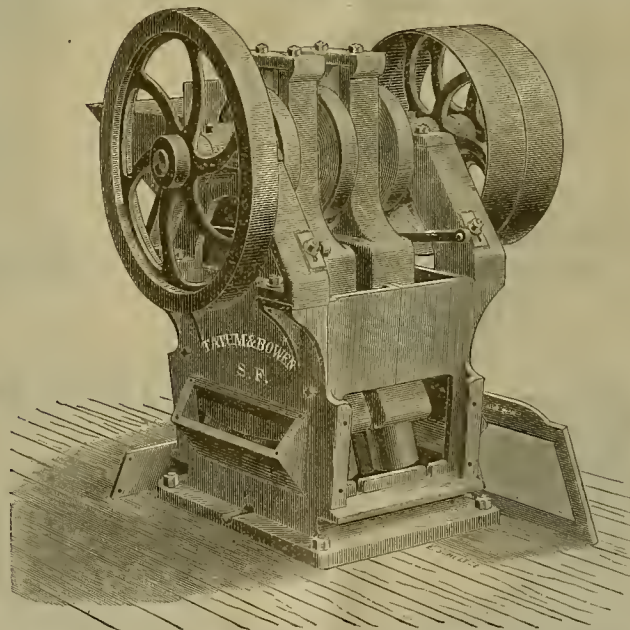
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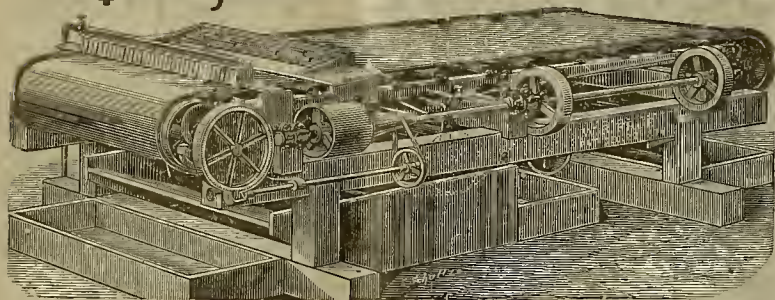
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DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

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N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

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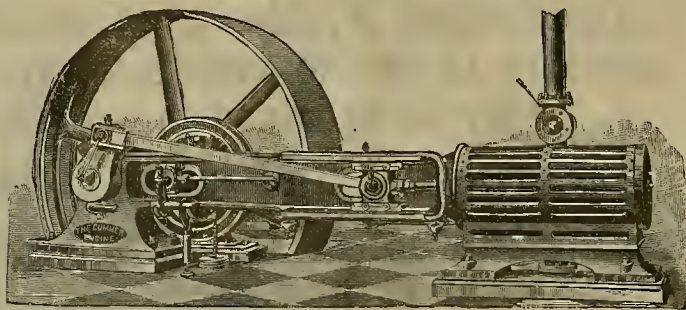
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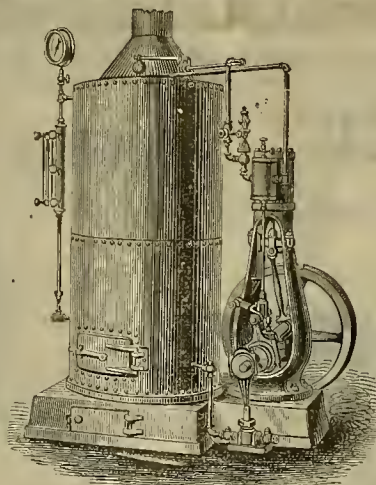
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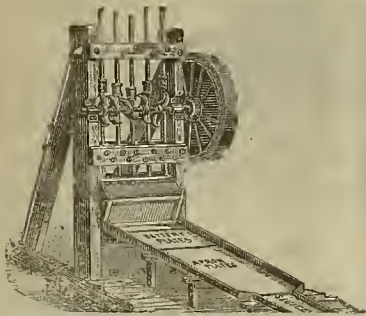
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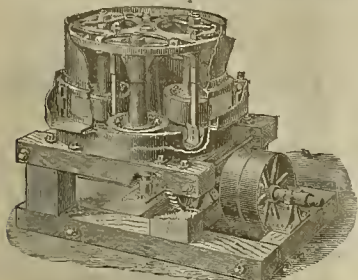
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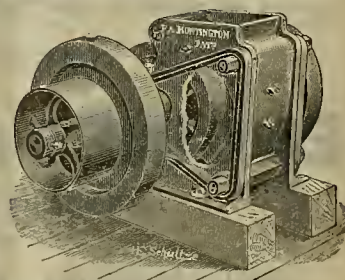
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An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 15, 1888.

VOLUME LVI.
Number 11.

Progressive Costa Rica.

Mr. E. G. Gaertner, mining engineer and superintendent of the Costa Rica Exploration Company, to whom we have on former occasions been indebted for much valuable information concerning that country, being again in the city, has favored us with a call. From Mr. Gaertner we learn that the several mining enterprises by foreigners, lately set on foot in Costa Rica, are in a prosperous condition, some of them succeeding beyond expectation; of these the most notable are La Trinidad, formerly owned by the Exploration Company, now the property of English parties, and La Union, which the Exploration Company still owns, and is working in an active and profitable way.

Oa La Trinidad mine a 40 stamp mill has been erected, and is now running. On La Union a 60-stamp mill is up and nearly completed. These mines are situated in the District of Cirreelitas, 20 miles north from Punta Arenas, the principal port of Costa Rica on the Pacific side. Connecting the mines with the port is a road capable of being traveled by two-wheeled carts. These vehicles are drawn by oxen, which haul from two to three tons to the load—cost of freight, \$30 per ton. The face of the country is rough, rendering the construction of good wagon-roads difficult and costly. Most of the transportation, all of that to more distant points, is done with pack-animals. The country is everywhere well supplied with wood and water, all the machinery in use being water-driven. The streams are generally rapid, making it possible to obtain almost any desirable head without building very long ditches. At La Union mill the water is delivered on a double-hocket patent wheel under a pressure of 450 feet.

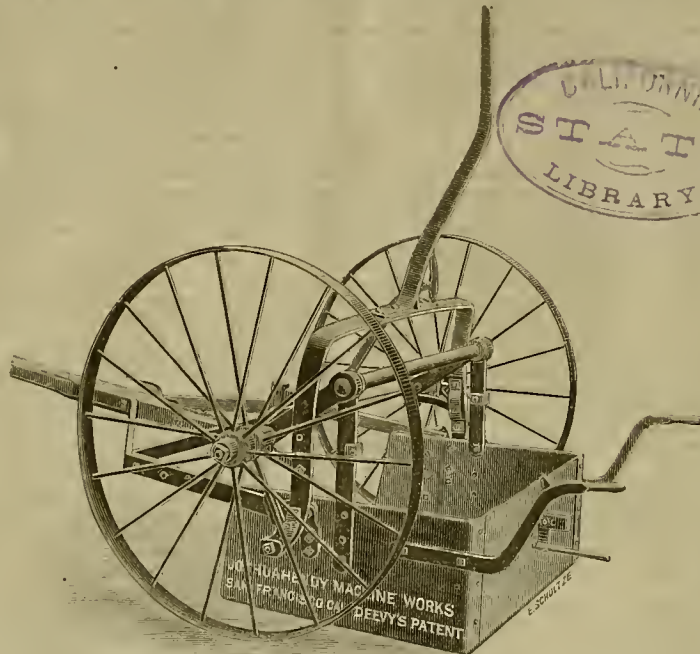
Among the more common trees are rosewood and cedar, the former being used for battery posts and the latter for battery blocks. Some of the rosewood trees cut down for this purpose would bring a small fortune in San Francisco.

The Exploration Company has secured government title to 14,000 acres of land, much of it mineral-bearing. The mines here all consist of auriferous quartz. There are no placers. The ledges are large—20 to 60 feet wide—occur in porphyry accompanied by dykes of sienite, their general strike being northwest and southeast. The ores are easily crushed and yield an average of \$15 per ton. The most of the gold is free, the concentrates being worth not over \$60 per ton. The Exploration Company employs native miners with a little imported skilled labor. The English company employs Italians, a hundred having lately been imported for this service. Native labor is cheap and tolerably efficient. La Trinidad mine has been worked for the past ten years, and has produced over \$400,000 with imperfect machinery. In the Aguacate district, farther in the interior, a good many quartz mines are being worked in a small way, the natives having not yet got into the practice of using improved machinery. Gradually, however, as they see the advantages of our method of carrying on the business, they will come to adopt it. All mining machinery for that country will be obtained in San Francisco. The big mills already put up there were made at the Union Iron Works in this city.

Of all the Central American States, Costa Rica is the most thrifty and progressive. The

natural resources of the country are also very great. Besides gold and some silver, Costa Rica produces several of the tropical staples in large quantities, such as indigo, sugar, cocoa,

PERSONAL.—We received a call last week from Mr. E. G. Gaertner, mining engineer of Punta Arena, Costa Rica, who favors the MINING AND SCIENTIFIC PRESS with an occasional



Scraper Ready to Fill.



Scraper Dumping Its Load.

THE "DEEVY" WHEELED SCRAPER.

coffee, sarsaparilla, etc. The climate is generally healthful, more especially in the interior, the temperature varying with elevation. This Republic extends from ocean to ocean, and a railroad is now being built across it via San Jose, the capital. Other enterprises of magnitude have been projected or are in contemplation, showing that the spirit of enterprise pervades the popular mind.

contribution. Our readers will recollect an interesting letter from his pen in this journal a few months since. In another column of this issue will be found some remarks on the mines of Costa Rica gathered from Mr. Gaertner, who is now in the city on business for the Costa Rica Exploration Company, which, completed, he returns to the theater of his duties and labors.

A Million-Dollar Fire.

One of the most disastrous conflagrations which ever visited San Francisco broke out about noon, on Sunday last, in the sash and blind factory of Day, Huber & Crocker, on Main street, near Howard. Property to the amount of fully one million of dollars was destroyed.

Among the heavy sufferers was the National Iron Works, corner of Main and Howard streets, owned by L. C. Marshutz and T. G. Cantrell. This company was very extensively engaged in the manufacture of steam engines, flour, sugar, saw and quartz mill machinery. They employed about 200 men. Their extensive plant of machinery was totally destroyed. We have not learned the amount of loss or of insurance, but we understand that there will be no cessation of business by their firm.

Other shops in the vicinity have generously tendered them whatever assistance they may need in filling the orders already on hand, and they are also prepared to receive orders for work, which will be as faithfully and promptly executed as though there had been no interruption. The California Machine Works, William H. Birch & Co., were not seriously damaged by fire as reported in the daily papers. There has been no interruption to their business whatever.

The total number of men thrown out of employment by this fire is about 1000; but many, if not a majority, of those engaged in the places of business destroyed will find work elsewhere until new buildings and shops can be erected, or in other shops beyond the limits of the fire to which business will go temporarily.

"Deevy" Wheeled Scrapers.

The form of earth-scraper known as the "Deevy" Wheeled Scraper, as shown in the accompanying cuts, was devised after more than two years of thorough practical experimentation, and embodies certain improvements not heretofore brought to notice.

Among the improvements in this machine it is claimed that they are more easily handled than any other form of scraper—one man being able to fill and dump the largest size as easily as two men can fill and dump any other style; that they will carry more cubic feet of earth than any other of similar size; and that they are more simple in construction, have fewer parts, and are consequently less liable to require repairs.

They are designed to withstand rough usage. The wheels are of wrought steel and iron, with wide tires, and need not be removed to oil the hubs. They will stand the exposure of every climate, as they have no wooden wheels to swell and shrink and decay. The tongue irons are built of double the usual strength of other styles, and the axles are correspondingly heavy. They are for sale by the Joshua Hendy Machine Works, Nos. 39 to 51 Fremont street, San Francisco, Cal., who are sole manufacturers in the Pacific States and Territories.

SHOULD BE STATED.—In our description of the improved four-sided molding machine, which appeared with illustrative cut in our last issue, it should have been stated that the agents for these machines for this coast are Messrs. Tatum & Bowen, 34 Fremont street, San Francisco, to whom we are indebted for cut.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—EDS.

Calaveras County Mines.

EDITORS PRESS:—The excessive heat is telling on the water supply of this section. To provide against a shortage in the future, the Union Water Co. is building an additional reservoir, which will store sufficient water for mining and irrigation in the section covered by the ditch. This water system was constructed in the early mining days to wash the placer claims. To reach these, distributing ditches were run on almost every mountain in this vicinity. Now that the quartz veins in these hills are being opened and their value proven, it is only necessary to drop a pipe down the mountain-side to the gulch below to obtain a fall for pressure of 300 feet or more. The great value of this condition in enabling the ore of this vicinity to be worked cheaply is not fully appreciated by the residents, though the fact that Mr. A. Hayward of Angels is constructing a six-mile ditch from a point just below Murphys to a hill opposite Angels, from which point he will pipe three miles to his mine in Angels to obtain 135 feet fall, shows by contrast in expense of obtaining power the natural advantages of this section.

On the Stanislaus river, Senator Dorsey's mines are considered "good enough to keep" and so are idle. "Lex" Johnson is driving ahead some 150 feet on his lode with a good showing. Uncle Tom Goodwin has not reported of late, but his various prospects are reported good.

Mr. Hallock, the inventor of the Robison process, has taken hold of the Collier mine, and once he gets in operation proposes subduing the rebellious but high-grade ore of this mine. Just below the Collier, Messrs. Josselyn & Lake of S. F. have resumed operations on the Cataract and Wide West hydraulic claims, their first mine being a location of 3500 inches of water on the Stanislaus. Mr. Buck is in charge. These claims cover large beds of rich gravel, and under proper management must prove all that their owners can desire.

Further south, the Mitchell gravel claims have put in a centrifugal pump of sufficient capacity to drain the "flat." The surface of this "flat" was worked over in early mining days, but the large gravel-beds below water level were scarcely touched. Various Californians have endeavored to get hold of these valuable mines, but litigation shut them out. Now, however, this obstacle has been removed, and the "flat" will be made to give up its store of gold. That it is there, and that in abundance, is easily proved.

The writer this week saw a miner, who works an adjoining claim, exchange about \$3000 of gold dust at one time, as the result of his clean-up. Chase & Pray have stopped their hydraulic till the water supply increases, as have also the Central Mill Co. Once these claims consolidate and obtain the dump of the one and high head of water on the other, they will have as good a property as they could wish.

Our miners are not troubled on account of their sloth, the tailings being free from pipe clay; the ranchers convey the tailings on to worked-out gravel claims, filling up the gulleys and covering the stone-piles, thus restoring what the early miner took away. In quartz, the Esmeralda is sinking an additional 100 feet with the vein now five feet wide; a hoist of one-ton capacity is being erected. The woods in the vicinity of the mine are full of prospectors and a number of locations each week is the result.

Cunliff & Driver are driving ahead on their Heroules mine and are now down 150 feet—16 feet vein. Sublett & Cutting, just out of Murphys, are drifting on "No. 3," are down 70 feet and have drifted the same distance. This mine is one of those "soft things" that seldom fall to the prospector's lot. While the owners keep quiet, it is known that "it's loney with gold," Sublett is driving the drift alone, taking out in coarse gold 15 ounces of gold the past week with every evidence of a bonanza ahead. May it stay by them!

The May Flower, now the property of S. F. Penlies, has been opened by shaft tunnel 40 feet, and from the crosscut drifts now 100 feet east and west on the vein into the hills on each side. They are now sinking, and a good hoist pump is contemplated. When these gentlemen came into the section the usual gang of black-mailers, that infect every mining camp, took them in hand and so discouraged them that they were almost persuaded not to go and look at the mine. Since taking possession, they have repeatedly been assured of their ultimate failure, but every stroke of the drill and pick has served to convince them that they have "a good thing," and they mean to stay by it. All the prospects of this section want is depth; the average of the present shafts is ten feet. Wherever these claims have been taken hold of and put down, they have shown increasing width and richness.

This field is as Angels was but a few years ago; then a quartz claim was looked upon as poor property, but when Mr. Hayward and others came into camp, put down their money and their shafts, the whole aspect changed, and to-day the old prospect-holes are eagerly bought up, the shaft put down, and one good mine after another added to the list in boom-

ing Angels. To the man of sufficient means I would say, "Come to Murphys. Select your prospect and go down or in on it, and obtain a good mine for little more than the cost of development in a section where ore can be worked for from \$1.50 to \$2.50 a ton." *Murphys, Cal.* E. H. SCHAEFFLE.

Mineral Resources of the United States.

Results of Work in 1887.

[By DAVID T. DAY, Chief of Division of Mining Statistics and Technology, U. S. Geological Survey.]

Metals.

Iron.—The principal statistics for 1887 were: Domestic iron ore consumed, about 1,300,000 long tons; value at mines, \$33,900,000. This is an increase over 1886 of 1,300,000 tons in quantity and \$5,900,000 in value. Imported iron ore consumed, 1,194,301 long tons; total iron ore consumed in 1887, about 2,494,301 long tons, or 1,454,868 tons more than in 1886. Pig iron made, 6,417,148 long tons; value at furnace, \$121,925,800. This is an increase over 1886 of 733,819 tons in quantity and \$26,730,040 in value. Steel of all kinds produced, 3,339,071 long tons, an increase of 776,569 tons over 1886; value at works, \$103,811,000. Total spot value of all iron and steel in the first stage of manufacture, excluding all duplications, \$171,103,000, an increase of \$28,603,000, as compared with 1886. Limestone, used as flux in the manufacture of pig iron in 1887, about 5,377,000 long tons; value at quarry, about \$3,226,200.

Gold and Silver.—The total value of gold produced in 1887 was \$33,100,000, a decrease of \$1,900,000 from 1886. Silver increased from \$51,000,000 in 1886 to \$53,400,000 (coinage value) in 1887.

Copper.—Total production 184,670,524 lbs., of which 3,750,000 lbs. were made from imported pyrites. The total value was \$21,052,440, at an average of 11.4 cents per pound. The estimated total consumption of copper in the United States increased by about 14 per cent.

Lead.—The production of lead was 160,700 short tons, valued at \$14,463,000 at \$90 per short ton. The heavy increase of "desilverized" lead from 114,829 short tons in 1886 to 135,552 in 1887 was probably due to the importation of Mexican lead-silver ore. The large product of non-argenteiferous lead, 25,148 short tons, is due chiefly to the development of the Saint Joe district in Missouri. The production of white lead, and the several oxides, from pig lead increased to a total of about 75,000 short tons.

Zinc.—The producers' returns show an increase from 42,611 short tons in 1886 to 50,340 in 1887. The price increased to 4½ cents per pound, making the total value in 1887, \$4,782,300. The production of zinc oxide was practically steady at 18,000 short tons, valued at \$1,440,000.

Quicksilver.—Production and value increased from 29,981 flasks, valued at \$1,060,000, to 33,825 flasks valued at \$1,429,000. Except 65 flasks from Oregon the total supply came from California. The price in 1887 varied from \$36.50 to \$45 per flask in San Francisco.

Nickel.—The supply includes 183,125 pounds of metallic nickel, valued at \$117,200; 10,846 pounds of metallic nickel contained in matte, and 11,595 pounds contained in nickel ammonium sulphate. Total value, \$133,200.

Cobalt Oxide.—The product includes 5769 pounds of cobalt oxide for potter's use, and 12,571 pounds of oxide in matte exported to Europe. Total value, \$18,774.

Chromium.—Shipments from California increased to 3000 long tons on account of better freight facilities by rail to the Eastern States. Total value in San Francisco was \$40,000.

Manganese.—The total production of manganese ore in the year ending December 31, 1887, was 34,524 long tons, valued at \$333,844. The production of manganiferous iron ore was 211,751 tons, valued at about \$600,000. The production of argenteiferous manganese ore was 60,000 tons, valued, chiefly for its silver, at about \$600,000.

Antimony.—The production, all in California, was 75 tons, valued at \$15,500. This is an increase from 35 tons in 1886, valued at \$7000.

Aluminum.—The production of aluminum bronze containing 10 per cent of aluminum increased to 144,764 pounds in 1887, valued at \$57,905. Other alloys, principally of iron and aluminum, amounted to 42,617 pounds, worth \$17,000.

Platinum.—Considerable search by dealers produced 445 ounces of crude platinum, valued at \$1838. Part of this came from British Columbia.

Fuels.

Coal.—The total production of all kinds of commercial coal in 1887 was 123,965,255 short tons (increase over 1886, 16,283,046 tons), valued at the mines at \$173,530,996 (increase, \$26,418,241). This may be divided into Pennsylvania anthracite, 39,506,255 short tons (increase, 2,809,780 short tons), or 35,273,442 long tons (increase, 2,508,732 long tons), valued at \$79,365,244 (increase, \$7,807,118); all other coals, including bituminous, brown coal, lignite, small lots of anthracite produced in Colorado and Arkansas, and 6000 tons of graphitic coal mined in Rhode Island, amounting in the aggregate to \$4,459,000 short tons (increase, 13,473,266 tons), valued at \$94,165,752 (increase, \$18,611,123).

The colliery consumption at the individual mines varies from nothing to 8 per cent of the

total output of the mines, being greatest at special Pennsylvania anthracite mines and lowest at those bituminous mines where the coal-bed lies nearly horizontal and where no steam-power or ventilating furnaces are needed. The averages for the different States vary from 2.1 to 6.1 per cent, the minimum average being in the Pennsylvania bituminous and the maximum average being in the Pennsylvania anthracite region.

The total output of the mines, including colliery consumption, was: Pennsylvania anthracite, 37,578,747 long tons (increase over 1886 2,725,670 long tons), or 42,088,197 short tons (increase, 3,052,751 short tons); all other coals, 87,837,360 short tons (increase, 14,129,403 tons), making the total output of all coals from mines in the United States, exclusive of slack coal thrown on the dumps, 129,925,557 short tons (increase, 17,182,154 tons), valued as follows: Anthracite \$84,552,181 (increase, \$8,433,061); bituminous, \$97,939,656 (increase, \$19,458,600); total value, \$182,491,837 (increase, \$27,891,661). The above figures show a notable increase in 1887 over 1886 in the aggregate output and value of both anthracite and bituminous coal.

Coke.—The total production of coke in the United States for the year ending December 31, 1887, was 7,857,487 short tons, valued at \$15,723,574. This is the greatest product ever reached in the United States, being 1,022,419 tons greater than in 1886.

Petroleum.—Total production, 25,249,543 barrels of 42 gallons each. The total value, at an average of 60 cents, was \$16,949,726. The increase over 1886 was very slight, only 139,428 barrels. There was a decrease of 1½ cents per barrel in the average price.

Natural Gas.—The production of natural gas in the United States in 1887 was equivalent to 9,055,000 short tons of coal displaced. This, at an average value of \$1.50 per ton, would make the value of the coal displaced by natural gas (which is the measure of the value of the gas) \$13,582,500. In 1886 the corresponding quantity was 6,353,000 tons, worth \$9,847,150.

Structural Materials.

Building Stone.—Direct returns from producers show a total value of \$25,000,000. This marked increase shows that the statement for 1886 was too small.

Brick and Tile.—Value, \$40,000,000. This represents an increase of about 13 per cent in the production of brick and a decrease in tile, owing to the drought in 1887 in Indiana and Ohio. Prices were slightly lower.

Lime.—The production is estimated at 46,750,000 barrels, with an average value of 50 cents per barrel.

Cement.—The production of cement from natural rock was 6,692,744 barrels, valued at 77½ cents per barrel, making \$5,186,877 as the value of a year's product.

Abrasive Materials.

Bluish stones.—The value of the total product is estimated at \$200,000.

Grindstones.—In Ohio and Michigan 37,400 tons were produced, valued at \$224,400.

Corundum.—Total production from North Carolina and Georgia 600 short tons, with a spot value of \$108,000.

Novaculite.—Production 1,200,000 pounds, valued in the rough state at \$16,000.

Infusorial Earth.—Maryland produced 3000 short tons, worth \$15,000. A small quantity was produced in Nevada and in New Mexico.

Miscellaneous.

Precious Stones.—The value of American gems in the rough state amounted to \$88,600, besides gold quartz for specimens and gems, valued at \$75,000.

Phosphate Rock.—South Carolina phosphate rock, 480,558 long tons, valued at \$1,836,818; an increase of 50,009 tons, but a decrease of \$36,118 in value, due to greater competition, reducing the price to \$3.75 per ton for land and \$4 for river rock.

Marls.—In New Jersey the production is estimated at 600,000 tons, worth about \$300,000. While the New Jersey marl is yielding slowly to commercial fertilizers, the Virginia marls, as well as those in North and South Carolina, Georgia, Mississippi, and Florida, are finding increased local use.

Salt.—Production in 1887, 7,831,962 barrels (of 280 pounds), value \$4,093,846. The annual production has increased each year since 1883, but the total value has declined, being less in 1887 than in 1884, although only 6,514,937 barrels were made in that year.

Bromine.—Stocks accumulated in 1886 and reduced the output of 1887 to 199,057 pounds, valued at \$61,717. The price was held at 31 cents per pound.

Borax.—Production, 11,000,000 pounds, all from California and Nevada. Total value, \$550,000, at 5 cents per pound for the average grade. The price was rising at the close of 1887.

Sulphur.—Production about 3000 tons from Utah, worth \$100,000. Litigation checked the use of an increased plant. The imports of Sicilian sulphur, with small shipments from Japan, were 96,882 long tons, valued at \$1,668,360.

Pyrites.—Production 52,500 long tons, valued at \$210,000, at \$4 per ton at the mines.

Barytes.—The production increased to 15,000 long tons of crude barytes, valued at \$75,000 at the mines.

Gypsum.—The condition of the industry is practically unchanged. The estimated total product was 95,000 short tons of crude gyp-

sum, valued at \$425,000. In addition, 162,154 long tons of crude gypsum were imported, chiefly from Nova Scotia.

Mica.—The production increased to 70,500 pounds, valued at \$142,250. The increase was chiefly in North Carolina. New Hampshire, Massachusetts, and Virginia also produce mica. No shipments were reported from the Black Hills or New Mexico. The use of mica waste is increasing; 2000 tons, worth \$15,000, were ground in 1887.

Feldspar.—The amount consumed, principally by potters, was 10,200 long tons, valued at \$36,100 before grinding. This includes freight to the principal markets, Trenton or New York. The consumption in 1886 was about 5000 tons less than the production returned by quarrymen.

Flint.—For pottery 19,800 tons were used. Including the use for sand-paper and in glass manufacture, the total consumption was about 32,000 tons, worth, on ground, \$155,000.

Potter's Clay.—The consumption of kaolin and ball clay by potters aggregated 28,000 tons, valued at \$290,000. In addition, the potters used 15,000 tons of fire-clay, worth \$50,000.

Asbestos.—The total product hardly exceeded 150 tons, worth \$4500. In addition, several hundred tons of fibrous actinolite were used for weighting paper.

Mineral Paints.—Including ochre, metallic paints, and small quantities of umber and sienna, the production amounted to 20,000 long tons, selling for \$310,000 at the mines.

Graphite.—The production at Ticonderoga is reported as unchanged. Small lots ranging from graphitic clay to pure graphite were produced in North Carolina. Total production, 416,000 pounds, worth \$34,000. This does not include 500 tons of impure graphite mined in Rhode Island for foundry facings.

Fluorspar.—The production remained constant at 5000 tons in Indiana. The total value was \$20,000.

Mineral Waters.—The product which was sold amounted to 8,259,609 gallons, worth \$1,261,473.

Totals.—The following tabular statement shows an aggregate value of \$538,056,345 for the year. This is the largest total ever reached by the mineral industries of any country. It is nearly \$73,000,000 more than the product of the United States in 1886 and considerably more than \$100,000,000 in excess of the year 1885. Of many items which have contributed to this result it will be noted that all the metals increased in quantity, except gold and the minor metal, nickel, and nearly all increased in price. The significance of this is seen in the increase in production of the fuels necessary for reducing these metals and preparing them for use. All of these fuels, including natural gas, show a marked increase. The increased value of building-stone is principally due to a more careful canvass of this industry than has been possible in previous years. It is not probable that the great total recorded for 1887 will be equaled in the present year, 1888.

METALLIC PRODUCTS OF THE UNITED STATES IN 1887.

	Quantity.	Value.
Pig iron, spot value, long tons...	6,417,148	\$121,925,800
Silver, coinage value, troy ozs....	41,260,240	\$3,441,300
Gold, coinage value, troy ozs....	1,536,500	\$3,100,000
Copper, value at N. Y. City, lbs. 184,670,524	184,670,524	21,052,440
Lead, value at N. Y. City, short tons	160,700	14,463,000
Zinc, value at N. Y. City, short tons	50,340	4,782,300
Quicksilver, value at S. F., flasks	33,825	1,429,000
Nickel, value at Philadelphia, lbs.	205,566	133,200
Aluminum contained in alloys	.....	74,006
Antimony, value at S. F., short tons	75	15,500
Platinum, value (crude) at N. Y. City, troy ounces	448	1,838
Total.....		\$250,419,283

NON-METALLIC MINERAL PRODUCTS OF THE UNITED STATES IN 1887 (SPOT VALUES).

	Quantity.	Value.
Bituminous coal, long tons.....	78,426,214	\$97,039,656
Pennsylvania anthracite, long tons	37,578,747	\$84,552,181
Building stone.....	.....	25,000,000
Lime, barrel.....	46,750,000	23,375,000
Petroleum, barrels.....	25,249,543	16,949,726
Natural gas.....	6,692,744	13,582,500
Cement, barrels.....	7,831,962	4,093,846
Limestone for iron flux, long tons	5,377,000	3,226,200
South Carolina phosphate rock, long tons	480,558	1,836,818
Zinc-white, short tons.....	15,000	1,440,000
Mineral waters, gallons sold.....	8,259,609	1,261,473
Borax, pounds.....	11,000,000	550,000
Gypsum, short tons.....	95,000	425,000
Manganese ore, long tons.....	34,524	333,844
Mineral paints, long tons.....	20,000	310,000
New Jersey marl, short tons.....	60,000	300,000
Pyrites, long tons.....	52,500	210,000
Flint, long tons.....	32,000	185,000
Mex. pounds.....	70,000	142,250
Sulphur, short tons.....	0	108,000
Precious stones.....	3,000	100,000
Crude barytes, long tons.....	15,000	75,000
Gold quartz, souvenirs, jewelry, etc.....	.....	75,000
Bromine, pounds.....	199,057	61,717
Feldspar, long tons.....	10,200	56,100
Chrome iron ore, long tons.....	3,000	40,000
Graphite, pounds.....	416,000	34,000
Fluorspar, short tons.....	5,000	30,000
Slate, ground as pigment, long tons	2,000	20,000
Cobalt oxide, pounds.....	18,340	18,774
Novaculite, pounds.....	1,200,000	16,000
Asphaltum, short tons.....	4,000	16,000
Asbestos, short tons.....	150	4,500
Rutil, pounds.....	1,000	3,000
Total.....		\$281,637,062

RESUME OF THE VALUES OF THE METALLIC AND NON-METALLIC MINERAL SUBSTANCES PRODUCED IN THE U. S. IN 1887.

Metals.....	\$250,419,283
Mineral substances named in the foregoing table.....	281,637,062
Total.....	\$532,056,345
Estimated value of mineral products unspeci-	
fied.....	6,000,000
Grand total.....	\$538,056,345



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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO

Saturday Morning, Sept. 15, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Progressive Costa Rica; A Million-Dollar Fire; "Deevey" Wheeled Scrapers, 173. Passing Events; The Secret of Their Success; Mining in Fresno County; The Tariff on Leads, 176. American vs. English Shipbuilding; Projected Building of this San Francisco Cremation Company, 177.

ILLUSTRATIONS.—The "Deevey" Wheeled Scraper, 173. Projected Edifice of the San Francisco Cremation Company, 177.

CORRESPONDENCE.—Calaveras County Mines, 174.

MISCELLANEOUS.—Mineral Resources of the United States, 174. The Russell Process; The Air in Coal Mines, 175.

SCIENTIFIC PROGRESS.—Photographing a Thunderbolt; What is Latent Heat; An Interesting Experiment with Water; The Coldest Spot on Earth; A Gloomy View of Modern Civilization; A Curious Phenomenon; A Marble Tablet, 178.

MECHANICAL PROGRESS.—Important Improvements in Pipe Joints; How to Secure Clean Castings; New Hydraulic Tube Press; An Alloy for Cold Soldering; The Castner Sodium-Aluminum Processes; New Tin Plate Machinery; Giant Hydraulic Presses; Flaws in Steel; Experiments with Sheet Copper; More Locomotive Working in Hot Water; Something New in the Mechanical Treatment of Leather, 178.

GOOD HEALTH.—Use and Abuse of the Brain; Celery for Rheumatism; Medicinal Value of Buttermilk, 179.

USEFUL INFORMATION.—The Manufacture of Mortar; Useful Colors; The Oil Rocket as a Defense Against Shipwreck; Cultivate the Use of the Left Hand; Fish Living in Hot Water; Economy in the Use of Sugar; The California Lion; Sawdust for Fuel, 179.

ENGINEERING NOTES.—The Oscillations of High Chimneys; Testing for Foundations; Direct Connection; A New Principal in Propulsion; A Canal Across Italy; Water for Paris, 179.

MINING SUMMARY.—From this various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 180-21.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 184.

Business Announcements.

[NEW THIS ISSUE.]

Assessment Notice—Lord of Lorn G. & S. M. Co.
Sampling Works—Oilepsy & Childs.

See Advertising Columns.

Passing Events.

More phenomenal weather has occurred on the coast during the past week. On Sunday we had a good sprinkling of rain which extended over a wide portion of the State, being the first precipitation of the season. On the 11th inst. a hot wave such as has never before been experienced swept over the city, this sultry blast having been preceded by a high wind that brought with it a dust-storm and followed by a smart shower which equalized the temperature and put an embargo on the dust.

Field and forest fire continue frequent in the interior of the State, some of them causing much damage.

On Sunday last a fire broke out in the lower part of San Francisco, and, sweeping over several blocks, proved the most destructive that has occurred in the city for some time past. Total loss, \$1,000,000, with but little insurance.

THE U. S. revenue cutter Bear arrived in port from the Arctic on the 6th instant, bringing news of a terrible storm which occurred Aug. 3d in the vicinity of Point Barrow, wrecking five vessels of the whaling fleet and damaging many others. The Bear had on board 109 seamen belonging to the lost vessels.

The Secret of Their Success.

The means by which certain operators in mining stocks manage to achieve an almost uniform success is to the many who fail cause for perpetual wonderment. Just now, when this branch of our "home industries" is so nearly paralyzed that we cannot, in remarking upon it, be suspected of trying to bull or bear the market, there being no market, is a good time to explain so far as may be the methods by which such success is reached; that is, as seen from our standpoint of view. It may, indeed, seem presumptuous, for one who has had so little experience in this branch of business, to essay a task of this kind, the writer never having gambled in these nor any other class of "securities"—never, in fact, knew the name of a card in his life. Nevertheless, it has so fallen to our lot that we have now and again been called upon to examine into this subject with such fitness for the work as has been vouchsafed us.

Let it be premised, then, that the present season of depression, the situation to the outsider seeming irretrievably desperate, is not regarded by the veteran professional, who well knows that this is according to the order of nature—knows that the resting and recuperative winter must precede the growing and maturing summer. This is his seedtime; the harvest will come by-and-by, when he who has industriously sown and patiently waited shall reap an abundant harvest. Now, therefore, when the bottom has gone out of the market and prices have fallen below zero, he proceeds to load up with mining shares, selecting only such as he has reason to believe will at some future time command a good price. But he goes about this quietly, picks up through his agents small lots here and there as opportunity offers; for until he has gathered in what he wants it is not his policy to "boost" the market. Indeed, while this gathering is going on everything possible is done to depress prices, at least of these particular stocks.

In so loading up the experienced speculator is not governed so much by the intrinsic value of the shares selected as by certain combinations made, or which he knows are to be made, to insure for the same a future market at good prices. How this is to be brought about, although not exactly a trade secret, forms an essential part of the business, which, it is needless to say, is conducted with system and exactness. It is not left to run itself, nor are outsiders permitted to run it, however much they may sometimes think they do so.

A buoyant mining-share market cannot, as some people suppose, be made to order, nor can its advent be much hastened through recourse to purely fictitious means. Its success, and even its possibility, are largely dependent on the existence of favorable conditions. The astute manipulator knows as well as the practical dairyman that milking-times must not be too frequent; he therefore awaits patiently the opportune season for repeating the process.

It might be thought that combinations formed for so making and controlling a mining share market would find their load a heavy one to carry by reason of the many assessments apt to be levied on their large holdings. Not at all—when it comes to paying their due, these fortunate parties are found to hold but few assessable shares. When it comes to voting or receiving dividends, they are found to hold always a good many. These wily people are not apt to load up with a stock till the annual assessment has been paid, and, as the yearly election approaches, they manage to borrow enough shares to re-elect their own board of trustees, and so continue the management in their own hands.

Now if any one thinks a business like this can be organized and carried on without money, nerve and skill, he is much mistaken. The men who combine for such purpose possess all these and a good deal more, manifesting often a tact, patience and care not always shown by those engaged in a more legitimate calling. They do not, like the dabbler in stocks, become panic-stricken, and let go just when they ought to hold on. They reverse the policy of the inexperienced "chipper-in," huying when others sell and selling when others buy, the secret of their success lying in their ability to do so. The men who form these associations do not become alarmed at a break in the market, and, like the multitude of small speculators, scurry away like a flock of scared sheep, which, once started,

rush headlong one way, even though it lead over a precipice.

To the investor of small means we would say avoid stock dealings altogether. This we tender as the best advice we can give him. If, however, he is bound to tempt fortune in this perilous field of adventure, then he had better lay aside everything else and devote his time, means and energies wholly to it. If he have aptitudes for the business, and is able to form an advantageous alliance, he may in the end achieve a success, though it will certainly cost him much hard work and possibly come twinges of conscience, if he have any.

Death of Proctor.

Richard A. Proctor, the famous astronomer, died Sept. 12th at the Willard Parker Hospital, New York City, of yellow fever. It is with great surprise we make this announcement, as he was a sturdy Englishman in the prime of life. He had been spending a few weeks with his family at Oaklawn, Marion county, Fla., where he had an observatory and one of the loveliest homes in the South. As he had not been near Jacksonville, it is difficult to explain how he contracted the contagion. He was on his way to England, and had secured passage on the steamship Umbria. While at the Westminster Hotel, where he had been in the habit of stopping the last 10 or 12 years, he complained of feeling fatigue and of indisposition. He went directly to his room and sent for a physician. As his symptoms were mysterious he was kept in isolation. Last Tuesday morning he grew worse, and the symptoms were such that it was thought best to send him to the hospital, where he soon succumbed to the yellow fever.

Richard Anthony Proctor was born on the 23d of March, 1837, at Chelsea, but having had health in his boyhood was chiefly educated at home. He pursued his studies afterward at King's College, London, and St. John's College, Cambridge, graduating in 1860 as twenty-third wrangler. In 1866 he was appointed a Fellow of the Royal Astronomical Society, and seven years later an honorary Fellow of King's College. He became honorary secretary of the society and editor of the Journal of Proceedings in February, 1872, but resigned the offices about one year later. He had carried out a series of original researches, analyzed results collected by the astronomers Herschel, Struve and others, and constructed a chart of 324,000 stars, which led him to a new theory of the structure of the stellar universe. He investigated also in 1874 and in 1882 the transits of Venus, and published many illustrative charts. In 1869 he maintained on theoretic grounds the since established theory of the solar corona, and also the inner complex solar atmosphere, afterward discovered by an American astronomer named Young. The deceased was the author of a number of astronomical works which are rated as standard publications. In 1879 he came to America and Australia, lecturing in all the principal towns of the colonies, and in 1881 started *Knowledge* as a weekly journal, but in 1885 changed it to a monthly.

He was a versatile writer and wielded a vigorous pen, being the author of over 60 books. Among his best-known works are "Saturn and Its System," "Handbook of the Stars," "Other Worlds Than Ours," "Half-Hours With the Telescope," "Light Science for Leisure Hours," "Borderland of Science," "Elementary Astronomy," "The Sun," "Transits of Venus," besides his universally admired "Atlas of the Stars."

The articles on astronomy in "Appleton's Encyclopedia" and the "Encyclopedia Britannica" were his works. He also has been for a number of years an industrious contributor to several magazines. He had constructed a chart of the heavens, and in 1874 added greatly to his reputation by his learned and important researches into the transits of Venus.

He was well known in this country as a lecturer, and though his manner was a little stiff and his style heavy with redundancy, still he abounded in vivid and striking illustrations, and was very popular.

He lost his first wife in January, 1879. The present Mrs. Proctor, who is a niece of General Jefferson Thompson of Virginia, married him in May, 1881. She is a lady of rare culture and very rich in her own right. Last year he decided to become an American citizen.

The Tariff on Lead.

The New York *Financial and Mining Record* is pleased to express the opinion that the proposed reduction of the duty on imported lead from \$40 to \$25 per ton will not injuriously affect the lead-mining interests in this country. The lead miners and their friends, however, hold to a contrary opinion, contending that such reduction if carried out will not only hurt but that it will prove disastrous to that industry, and even in many instances destroy it altogether.

In considering a question concerning which one set of opinions so antagonize another, it is natural to inquire who would be most likely to have an intelligent understanding of the subject, parties living in the lead-producing districts and conversant with the conditions that there obtain, or parties living on the Atlantic seaboard, thousands of miles away from those districts, and who can, of their own personal knowledge, know little about the business. The answer to such inquiry is obvious. The lead-producing people must themselves be the better authority. They have opportunities to acquaint themselves with the situation—to learn the conditions of the business and the wants of those engaged in it which the stranger has not.

But, apart from this aspect of the question, to what end, let us ask, this proposed reduction in the duties on lead imported from abroad? It can have but one object, viz., reduction of the cost of this article to the consumer. But considered in the long run, will it effect that end? We do not think it will, as much of our past experience tends to establish.

In every instance where these domestic industries for the use of which we produce the raw material have been duly protected against foreign competition, the products of these industries have in the end been cheapened. Their prices, advanced perhaps a little at first, while these various branches of business were being established, have afterward gradually declined, being forced down by home competition. This has been true of our agricultural, our mechanical, our mining, in fact of all our industries, manufacturing included.

On this coast, copper, quicksilver, salt, lead, borax, wool, wine, fruit, in short every pursuit made possible in the first instance only through the protection extended to it, serves to illustrate, while it proves the soundness of our argument. Ever since these several industries gained a permanent foothold, the commodities here named have steadily tended to lower prices, until they have at last reached the lowest figures compatible with the continued existence of these industries. In nearly every case these articles are supplied to the consumer at as low a figure as they could be were they imported from abroad.

If this be so, says the objector, if we can make these things as cheaply as they can be made in other countries, what need for imposing a duty on their importation? Simply this, to enable our own manufacturer to build up and establish his business and afterward secure to him the home market. This, in a few words, comprises the whole argument.

There is, however, another factor of the case, and one which, strange to say, has by both parties to this controversy been treated as inconsequential or wholly overlooked. It seems to have been forgotten that here in the United States we are receiving every few years a million people from Europe and other over-populated countries. For these people we are expected to provide employment, very few of them being able to become self-employers. Not ten per cent of these immigrants have means to settle on the land or go out into the mines of the far West and there make a living. Labor, therefore, must be furnished for them, mechanical and manufacturing pursuits being those most available to that end. This being the case, we may well seek to protect this class of industries against foreign competition, for it cannot be expected that we will receive the surplus labor of these countries and the product of the cheap labor they retain at home as well. This makes our case exceptional: we are not exporting labor to other countries, but receiving it from all. The whole world is emptying its superfluous population on us; and to this we do not object if only they will abstain or can be prevented from flooding our country with the products of the ill-rewarded labor of these over-peopled lands. This is an element of the labor and protection problems that seems to have received too little consideration.

American vs. English Ship-Building.

An opinion seems to have gained quite general prevalence on both sides of the Atlantic that our people are quite behind the English and Scotch in ship-building affairs. But a little examination into the matter will satisfy any impartial mind that the fact is quite the reverse.

It was not long since remarked by a New York journal that at that time there were in the harbor of New York two steamships which were likely to revolutionize sea and river navigation. They were the City of New York, presumed to be the best product of English naval ingenuity, and the Monmouth, an American ship built on the Delaware, for service between New York and Sandy Hook, a distance of about 20 miles. Both have two screws, and both have triple expansion engines. The wonderful speed that was then expected of the City of New York has not been realized. She has just been beaten in the great ocean race. Her failures may possibly be due to the newness of her

war ships was created by Congress, which inquired fully into the matter of building war-ships. The evidence collected showed quite conclusively that the English ship-builder had no decided advantage over the American, either as to price or skill. There are many differences in methods of construction; but the materials of the American ships average better throughout. The workmanship is better, the outfit is more complete, and the accommodations for both officers and men are superior. It is possible that the English ship of the same class and tonnage might be built a little cheaper, but it would be at the sacrifice of the many points of superiority which are found in the American ship. During his examination before the committee, Mr. Cramp, the great American ship-builder, said:

"For a high order of work there has not been a great difference in prices between us and the English ship-builders. We would be glad and willing to build at the rates the Cunard people have been giving for their ships. They always give big prices and have the best builders. We

City of New York, and then we shall know what speed and comfort are.

Mr. Cramp is also authority for saying that American ship-joiners are the best in the world, and as an evidence of the truth of this assertion he said that one of the leading master ship-joiners of New York had been time and again solicited to go to England and take charge of the joiner work for some of the English crack ships.

The New York Sun, in speaking of the progress which has lately been made in ship-building, says:

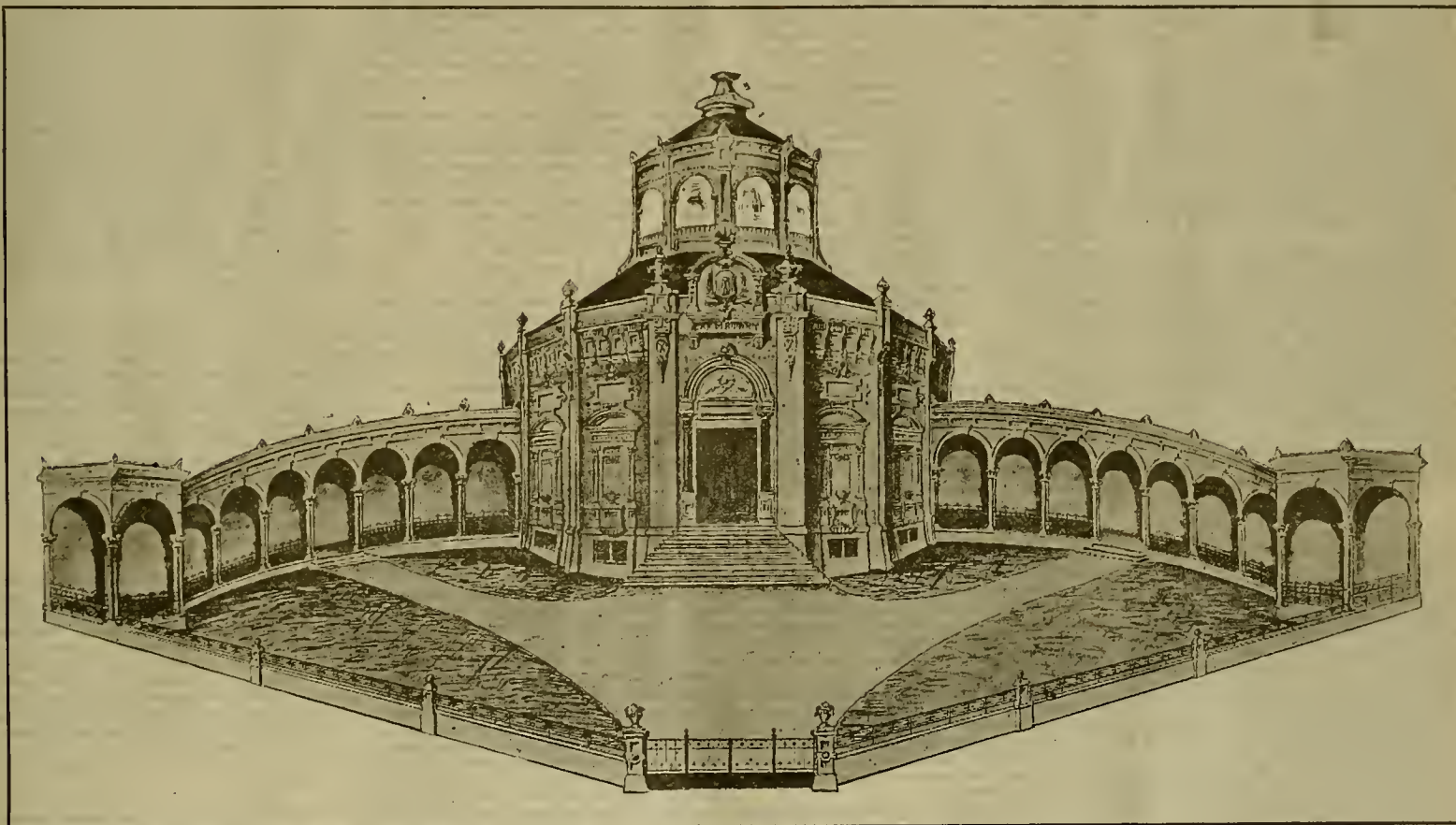
"About the only improvement of consequence made in marine vessels in the past 30 years has been in their machinery. The side-wheel steamships have disappeared. They are too expensive to compete with propellers, and, besides, too slow. What the ordinary propeller has done to the side-wheeler, the triple and the proposed quadruple and even quintuple expansion engines, attached to twin screws, will do to them. Speed and economy are the great objects of marine architects, and until some

consummation, the members confidently believe, notwithstanding our people, so distinguished for their advanced views and liberality, have not as yet extended to this enterprise the aid or encouragement that was to have been expected.

In reference to the new method of dealing with our mortal remains the society, through their circulars, makes the statement that they do not, at this time, propose to enter into details as to the merits of incineration further than to say that it is, through the whole civilized world, forging ahead with rapid strides as the most natural, practical, economical, safe, and, from a sanitary standpoint, the most desirable plan for disposing of the dead.

Cremation has now taken a strong foothold elsewhere in the United States, being successfully in operation in nearly all our large cities.

But besides the esthetic, economic and sanitary advantages of cremation, as above set forth, there is still another which, while it will have little weight with most people, is by others regarded as worthy of consideration and even as being of vital importance. It is held, then, by



PROJECTED EDIFICE OF THE SAN FRANCISCO CREMATION COMPANY.

machinery. But the American-built Monmouth has been in service about the same length of time and yet has shown such speed and economy of fuel as to fix the eyes of the maritime world on both sides of the Atlantic upon her in wonder and admiration. She burns but one-half as much coal as the ordinary side-wheel, walking-beam steamer running on the same line, yet she is much faster. It is claimed for her that she can easily average 18 miles an hour in ocean way. This would make her the fastest passenger vessel in the world with the exception of two or three of the trans-Atlantic greyhounds, which have shown greater speed in proportion to tonnage, but have cost two or three times as much, in proportion, to give them their great speed.

American yachts have again and again beaten the fastest English yachts. An American sailing ship, the Sovereign of the Seas, has made the greatest number of miles ever sailed in 24 hours. Nowhere in the world can there be found more splendidly equipped or faster river steamers than those upon our American inland waters. The same may be said of our coast-wise steamers. What has been said as to our advantage in speed and equipment is also true in regard to economy in fuel. Every one knows of the complete revolution which was introduced in naval warfare by the appearance of our iron-clads during our late civil war. The idea was conceived and carried into complete success by American builders and mechanics.

In 1836 a special committee on ordnance and

would like to fill our yard with the sort of work the Elders have been doing for the Cunard people at the same prices."

Mr. Cramp further stated that "he could build equally as good as theirs, and better as regards the accommodations for the comfort of those on board."

It further appears that the president of the Cunard Company once visited Mr. Cramp's yard, thoroughly inspected Mr. Gould's yacht, and stated that he was giving \$30,000 more to his English builders for a yacht for himself no better than Gould's.

Mr. Cramp further, in the course of the conversation, told the Cunard president that a large majority of the business of the Cunarders had been derived from Americans, and that it would be a compliment to their chief patrons to build one of their new ships here. He had offered to duplicate the Servia for the same price and guaranteed to heat her time across the ocean. This rather startled him, and he said the matter had never been presented to him in that light. But the Englishman took good care to have his last two vessels built on the Clyde. That was a *bona fide* offer from one business man to another. He wanted new ships, we wanted work, and every proposition that was made meant business. Mr. Cramp's firm still holds that offer open to Mr. Burns or anybody else. He will undertake at any time to duplicate any of the higher classes of English work at English prices. Some day perhaps we may have an American ship of the size of the

new and better method of propulsion for vessels is found, the compounding of engines and twin screws will be the favorite method. American mechanics are noted for their skill and ingenuity, and now they have turned their attention to the multiple expansion engines."

Projected Building of the S. F. Cremation Company.

We present herewith a cut of the building proposed to be erected by the San Francisco Cremation Company, the site selected for the same being the 50-vara lot on the corner of California and Laurel streets, two blocks beyond the terminus of the California Street Cable road. The architecture and general style of the edifice being sufficiently shown by the cut, it only remains in this connection to say that all the appointments of this beautiful structure will be in keeping with its exterior appearance. The society, which includes many of our leading citizens, is now taking steps to raise funds for erecting the projected building, and they hope soon to accomplish.

In their circular appealing to the public for aid, the society sets forth that there are now 98 shares at \$50 each subscribed and fully paid in, but a completion of the planned crematory will entail an expense of about \$25,000.

That the friends of enlightened progress in this community will furnish the funds required to enable the society to carry the noble work they have in hand to an early and successful

some, that the spiritual part of man cannot wholly escape from the physical until a complete dissolution of the latter has taken place. Hence, whatever hastens the disintegration of the material system is not only proper but highly desirable. By this class of progressionists recourse to embalming or other means for defeating or retarding the process of natural dissolution is condemned as being unphilosophical and cruel. Whether there be anything in this or not, certain it is the people who hold the doctrine are quite numerous, and, being all the advocates of cremation, will ultimately greatly strengthen the method.

In appealing to the public for financial aid the society does not make such claim on the ground of charity, being satisfied that all who give can, if they choose, realize great and lasting advantages from their benefaction. The cost of cremating a body will not at this institution exceed the sum of \$25, a great number of niches having been prepared in the walls of the edifice for receiving and keeping the ashes of those who undergo incineration.

The snowsheds a mile west of Truckee caught fire from a locomotive on the afternoon of the 7th. A watchman discovered it immediately and fire-trains from Truckee and the Summit soon arrived, but 1300 feet of sheds were burned up completely.

On Friday of last week the mercury at Yuma registered 132° in the shade—the hottest day there on record.

SCIENTIFIC PROGRESS.

Photographing a Thunderbolt.

Hitherto, we believe, there has been no success in the attempts at photographing a flash of lightning. If the exact locality and time of a thunderbolt could be known a minute beforehand, it might simplify the problem somewhat. But at any rate, the enterprise has been successful in one case. During a thunderstorm at Wakefield, Mass., on Saturday night, the 23d of June, Mr. A. H. Bidden, cashier in the office of the Boston Herald, succeeded in obtaining two good negatives of thunderbolts. From these he has developed some fine pictures, large and accurate in detail, and highly interesting as studies, both in the photographer's art and in natural philosophy. One shows a big bolt descending in a slightly zigzag shape, seemingly into the ground. A closer inspection, by the aid of a magnifying glass, discloses the appearance of a spiral motion. It seems to show that the bolt descended, in reality, spirally. This of itself is a fact of some interest and (it may be) of some importance. Doubtless the suggestion it involves will be aided by other experiments to demonstrate or disprove the seeming fact.

The other picture is still more curious. It reveals three principal bolts descending in different places, and a novel scene is disclosed in the shape of numerous thread-like streams of fire, connecting from both sides with each of the main streams. The resemblance to a number of large rivers, on a map, which shows also their numerous affluents, is so striking that it must impress every beholder. This triple blaze of lightning, descending in three widely separated bolts, seems to be visibly connected with a general "crinkling" development of the electric fire about all that part of the sky—a general flashing out of little bolts from the greater, and frequently almost at right angles with the main shaft.

These things no doubt occur in very many thunderstorms, but are not seen in their detail, owing to the swiftness of the movement. If the storm occurs at night, of course the exhibition is far more splendid, but the general impression received by the beholder is of a large and dazzling display of electricity in zigzag bolts and crinkling side-flashes that play against the dark background of the night sky in a manner too rapid to admit of discerning the details. This photograph reveals the details, and it is a surprising scene. Mr. L. B. Merriam of this city has a copy of both pictures. —*Hartford (Conn.) Times.*

What Is Latent Heat?

Heat has its equivalent in mechanical work, and when heat disappears work of some kind will be done to take its place. When a body changes from the liquid to the gaseous form the molecules have to be separated and placed in different positions with regard to each other. This calls for an expenditure of work. This work is supplied by heat which disappears at the time. One can hold his hand in steam escaping from the safety valve of a boiler for this reason. The heat of the steam disappears in pushing apart and rearranging the molecules of the steam as it expands when it leaves the safety valve.

The term latent heat, as commonly used, means the amount of heat which disappears when water changes from a liquid into steam. This is considerable, as will be seen by consulting any table of the heat contained in steam and the water from which it comes.

Water at 212° contains 180 units of heat. Steam at 212° contains 1146 units of heat. The latent heat is the difference of 966 units. Such a large quantity disappears when liquid water changes to steam that boiling water cannot be raised above 212° no matter how hard it is boiled. The heat becomes latent and the mechanical work, or rather molecular work, is sufficient to take up all that is supplied by the fire.

The specific heat of air at constant pressure being 0.2377, the specific heat of water, which is 1, is therefore 4.1733 times greater under ordinary circumstances. A pound of water losing 1° of heat, or 1 thermal unit, will consequently raise the temperature of 4.17 pounds, or, at ordinary temperatures, say 50 cubic feet of air, 1°. A pound of steam at atmospheric pressure, having a temperature of 212° F., in condensing to water at 212° F., yields 966 thermal units, which, if utilized, would raise the temperature of $5 \times 966 = 4830$ cubic feet of air 1°, or about 690 cubic feet from 0° to 70° F.

AN INTERESTING EXPERIMENT WITH WATER. The apparent paradox that the most transparent water is at the same time perfectly opaque from a certain point of view is shown by simple experiment. Partly fill a glass goblet with clear water, and hold it a little above the level of the eye and distant a foot or more. No object can be seen when held just over the surface of the water, but the water surface appears like a burnished mirror.

THE COLDEST SPOT ON EARTH is said by Lient. Schwatka during a late interview to be around the magnetic pole and not around the true pole of the earth. Hence the greater probability of there being an open sea about the north pole. The lieutenant found it 71° F. below zero at the magnetic pole. He further says: "There is a peculiar misunderstanding about such a low temperature in the scientific world. I remem-

ber reading in the *Popular Science Monthly*, which is supposed to be accurate, a statement to the effect that at 71° cold meat taken from a boiling pot will freeze solid before it can be put into the mouth. That is nonsense. Why, I have been naked in a temperature of 68° below. It was inside a snow hut as I took off my clothes and got into a sleeping-bag. It is the wind that plays the mischief with everybody; but, fortunately, the colder it gets the stiller it gets, and when it gets way down it's pretty quiet, I can tell you. But when you get back to the ordinary temperatures, then comes the torture. When I got on the whaler and began to get south I suffered excruciatingly, and thought I should suffocate; a fish out of water was nothing to it."

A Gloomy View of Modern Civilization.

In an address recently delivered in England by Prof. Huxley, he takes the ground that modern industrial activity and competition is simply a warfare carried on under the forms of peace, and that the men or the nations who secured victory in this warfare defeated their opponents by starvation. In other words, that all the new discoveries in the arts and sciences, by which processes or products of manufacture are improved or rendered cheaper, and which are generally regarded as blessings to mankind, are, in reality, simply additional or improved weapons by which the individual company, or nation who can control and make the best or exclusive use of such inventions or improvements, is enabled to more successfully carry on this warfare, and all the more easily and certainly inflict upon their competitors or opponents the penalty of defeat—starvation.

This address was delivered in support of a proposed institute in which it is intended to offer to the youth of England the best possible facilities for obtaining technical training and education. The idea advanced by the learned professor was that, this condition of war being recognized, it was necessary for England to secure for herself the best possible weapons for waging that war, and that one of the most effective weapons was to be found in technical education.

There is much food for thought in such a declaration, says the *American Machinist*, coming from such a source, and it would be a great satisfaction if we could deny its truth; but can we? And if we cannot deny its truth, then it becomes pertinent to inquire if a progressive civilization, which carries with it such results, is worth what it costs, and whether or not it can continue to progress, if, by its progress, it inflicts such a penalty upon those who are unable to attain the victory.

England has recently been meeting reverses in this industrial warfare, and the penalty of hunger has been suffered by many of her working people. Suppose that, by means of the improved weapon which Prof. Huxley speaks of, she regains her lost ground, will it not be at the expense of other industrial armies, composed of human beings, who have claims upon our sympathies?

Altogether it is a very gloomy view of the situation, but we have faith to believe that a better condition of things will be developed, and that civilization will eventually progress without the infliction of such a penalty upon those who may be surpassed in ingenuity and skill by their fellow-man.

We have no theory to advocate to bring about this condition, but we think that, for the best interests of mankind, such a condition must be brought about, and that in some way it will be.

A CURIOUS PHENOMENON is described by a correspondent of the *Germantown (Penn.) Telegraph* as having occurred at Vernon, Iowa, on the evening of July 12th, which was noticed with much interest by people for five miles around that place. The correspondent writes as follows: "The mercury in the middle of the day stood at about 86°. As evening approached a small luminous yellowish cloud arose out of the northwest and slowly floated away to the south. When sunset came the cloud was about west of us, and perhaps 30 degrees above the horizon, when the air became extremely warm, so much so that people became alarmed and wondered what was coming, some thinking they would die. This was all between sunset and dark, and right when the heat was most alarming a cold wind struck us from the northeast, and in a minute the heat and alarm were all gone, and the night was cool and pleasant to sleep. Now what was all that? Morse's geography of the last century tells us that in 1772 an electrical cloud passed over the island of Java and killed 1240 persons. Was our experience of the same kind as that of Java?"

A MARBLE TABLET recently found in an ancient sepulcher on the Via Portuensis, Rome, is apparently a work of the first century. It represents a naked youth, with long, disheveled hair, defending himself against two women, one facing him, and the other attacking him from behind. The women brandish weapons resembling lances in one hand, and a serpent winds itself around the other arm of each, and they seem as if about to sling them at the face of the youth. Archaeologists are puzzled to know what it is all about, but believe it represents the death of Pentheus, who was torn in pieces by Maenads on Mount Cithæron for having reviled the Bacchic mysteries.

MECHANICAL PROGRESS.

Important Improvements in Pipe Joints.

A new English invention of undoubted value, which may soon be manufactured in Pittsburg, is the patent wrought-iron pipe joint, invented by Mr. F. A. Williams, and manufactured in England, at the Britannia Tube Works, Wolverhampton. These joints are being worked under an intermittent pressure of 1200 pounds per square inch, and at various other English mining and engineering establishments they have been adopted with much success.

They are said to be especially suitable for petroleum pipe lines. A special virtue of the invention, which will probably do as much as anything to secure its popularity in America, is the fact that it is, in the words of the inventor, "the thing for petroleum pipe lines." In the first place, it may be attached to tubes of any thickness, and it can be made strong enough to stand any pressure. The makers claim also that the tubes are not weakened by having a thread cut upon them, and the joint can be connected in much less time than is needed to connect a screwed joint.

The method of connecting the tubes is by a slight angle, which may save the trouble and expense of bending them, and a packing of gutta-percha, india-rubber, asbestos, metallic lead, etc., is supplied to fit upon the ferrule, so that when the joint is once braced up the packing cannot readily escape.

Another advantage of the joint is that when ordinary galvanized tubes are screwed the coating of spelter is necessarily cut away, and as the socket never actually covers the whole of the threads, there is a portion of bright metal exposed which is subjected to corrosion, and this part is unfortunately thinner than the body of the tube by the depth of the thread. But galvanized tubes fitted with the Williams joint are not touched by a cutting tool and no part can corrode. Finally, in the maker's words, "the prices are much lower than those of any other tubes in the market, and compare successfully with cast-iron pipes." I may add that many miles of piping fitted with Mr. Williams' joint have been laid up to the present without the occurrence of a single leakage. —*English Cor. American Manufacturer.*

HOW TO SECURE CLEAN CASTINGS.—Clean castings are not always easy to make. A European authority gives a method used by a Dusseldorf firm to separate the light impurities from molten iron or other metals in the operation of casting, with a view to securing pure and clean castings. The "separator" is placed upon the inlet aperture of the molding-box and consists of a rectangular casing provided with a number of transverse partitions, dividing the casing into a series of separate chambers, which are in communication by means of openings at the bottom of the partitions. The molten metal is poured into the separator at one end and is caused to pass through the several compartments in the apparatus before it can enter the molding-box, the light impurities being in this way caused to rise to the surface and prevented from entering the mold with the metal. As the metal passes from compartment to compartment, more and more of the impurities are separated, until the metal reaches the inlet to the mold in a practically pure state; air is also effectually prevented from entering the mold together with the metal. In the second chamber there is arranged near the inlet a round iron rod, which produces ebullition of the metal, causing the impurities to rise to the surface. It is stated that by the use of this apparatus exceeding dense and pure castings may be produced. —*Mechanical and Milling News.*

NEW HYDRAULIC TUBE PRESS.—We had this week the privilege of inspecting a powerful hydraulic tube press for forming metal and steel tubes from circular plates by pressing or forcing them by the aid of mandrels through dies or annular rings. The press is designed and built by Messrs. Henry Bessemer & Co. of Sheffield, for the Birmingham Small Arms Factory, to be used for the manufacture of tubes of large size, and more particularly for making shrapnel, segment, and other hollow steel projectiles which the Government is now anxious to obtain. Hitherto these projectiles used by the English artillery have been made of either cast iron or steel, but the wrought material has proved so much superior that forged hollow projectiles are bound to supersede the present cast materials. The press is built entirely of Bessemer steel of sufficient strength to impart a downward pressure of about 1500 tons, with a stroke of 12 feet. It is also furnished with two cylinders with an upward pressure of 500 tons for the purpose of stripping tubes from mandrels. This novel process of producing hollow tubes and projectiles will dispense with the old method of boring them from the solid bar, which was not only very expensive, but prevented rapidity and extent of output. —*English Paper.*

AN ALLOY FOR COLD SOLDERING.—*La Metalurgie* describes a new alloy which is useful when metals are required to be soldered together at a low temperature. Finely divided copper is obtained by adding zinc to a solution of sulphate of copper. From 20 to 30 parts of this copper, according to the hardness required, are mixed in a cast-iron or porcelain mortar

with concentrated sulphuric acid, to which is added 70 parts of mercury. The amalgam thus formed is thoroughly washed with water, in order to remove the sulphuric acid, and after being left untouched for some time it becomes sufficiently hard to scratch lead. In using the alloy for soldering, it is warmed until it assumes the consistency of wax, in which state it can be applied to the joint.

THE CASTNER SODIUM-ALUMINUM PROCESSES. The manufacture of cheap aluminum has been the dream of the metallurgist for many years, and innumerable have been the "processes" proposed for its realization. Among the most successful of these are the Kleiner method and the Castner method. Each of these methods makes aluminum through the reducing effect of sodium, and as the production of this is necessarily expensive by any method of manufacture yet known, the improvement effected by these processes, though great, seems to us to be only a step in the right direction, and to be indeed a step on a road that will never lead up to, though it approaches, the desired goal—cheap aluminum. This dream, if dream it may be called, must be realized by some direct method, which will take a cheap ore and reduce the metal so as to give it to us at the cost of copper or zinc or lead.

NEW TIN PLATE MACHINERY.—One of the most recent improvements in the mechanism of tin-plate manufacture is the Clydock patent tinning machine. The unique design and ingenious construction of this new apparatus renders it an object of much attention in England. It performs all the work of coating sheets automatically. The action of the mechanical arm attached to the machine for the transference of the plates from the tinning-pot to a rack ready for the cleaning process, is a very interesting and novel feature. The operation is effected without the disadvantage of leaving marks—the not infrequent accompaniment of manual treatment. Fewer wasters are consequently caused, and economy in materials, labor and fuel is also effected.

GIGANTIC HYDRAULIC PRESSES.—In some of the large shops at Sheffield, Eng., gigantic steel forgings are dealt with in a manner that a few years ago would hardly have entered into the heart of man as possible. Hydraulic presses working up to 4000 or 5000 tons are sometimes the engines which men have called to their aid. These things naturally call to mind the question—How are the vast forgings of the future to be hauled; how are they to be carried from the place of production to that where they are to be used? It is these thoughts which have led to the idea of constructing a ship canal from Sheffield to tide-water.

FLAWS IN STEEL.—A correspondent of the *American Machinist*, in allusion to the longitudinal cracks so often met with in wrought steel, explains the trouble as follows: The steel is simply piped. It is caused by hammering the steel when it is too cold under the trip or steam hammers, but sometimes by a flaw in the ingot. It is frequently seen in small tips when they have been forged, from large steel down to small sizes, and some smiths are liable to hammer a piece of cast steel too cold. When so hammered, it will crack in the center almost every time.

EXPERIMENTS WITH SHEET COPPER.—Some very careful experiments to ascertain the effect of increased temperatures upon sheet copper were made several years ago by the Franklin Institute of Philadelphia. Strips of copper were pulled asunder in a properly designed machine at various temperatures ranging from 122° to 1332° F. It was found that there was a gradual and regular falling off in strength as the temperature was increased until the point of 1332° was reached. At this point the copper was at a red heat and the tenacity was nil.

MORE LOCOMOTIVE WORKS.—Some idea of the rapidly increasing necessity for locomotives and cars to meet the demands of our immense interior commerce may be inferred from the fact that the Pennsylvania Railroad Company has resolved to erect immediately at Altoona five immense railroad-shops at a cost of \$100,000 each. The shops will have a capacity for turning out 150 locomotives a year. That company proposes to concentrate all their engine and car-building at that central point on their road.

NEW TAY BRIDGE.—Professor Ewing of University college, Dundee, has recently made a number of seismographic observations on the new Tay bridge. The instrument, which was placed on the southernmost of the great girders, records the vibration during the whole time a train is on the bridge. As the latter comes on at the Dundee end, $\frac{1}{2}$ miles away, oscillations of 1-500 inch are observable, which increase as the train advances to a maximum of one-half inch.

SOMETHING NEW IN THE MECHANICAL TREATMENT OF LEATHER.—Mr. H. F. Bird, of Boston, Mass., has perfected a method for rendering worthless leather valuable by plumping, stiffening and waterproofing the same for use for in-soles, counters, box-toes, etc. He is able to waterproof every part of the shoe or boot either before or after it is finished. A company has been formed to carry on the business with a capital of \$100,000.

GOOD HEALTH.

Use and Abuse of the Brain.

There is a curious disease of the nervous system which is produced by continually using the fingers in the same way for many hours at a time. It is called, according to the occupation of the sufferer, "writers' cramp," "fiddlers' cramp," "engravers' cramp," "telegraphers' cramp," "type-writers' cramp," and so on. The most remarkable feature about the disorder is, that though the subject of it cannot execute the movements necessary to his profession, and which occasion the affection, he can do anything else with his fingers. Thus the book-keeper affected with "writers' cramp," though seized with a spasm of the fingers the moment he begins to write, can use the same fingers in playing the violin, setting type, or, in fact, in executing even the most complicated movement without the slightest difficulty, provided he possesses the requisite technical skill. The nerves are simply exhausted for the particular work which he has been carrying on for years. They have got in a rut, as it were, and cannot get out till rest and change of occupation have permitted them to accumulate the special kind of force needed for writing.

What is true of nerves and muscles is equally true of that organ from which the nerves and muscles receive their force. Excessive use, especially within a limited range, is certain to damage and sometimes to absolutely destroy the parts of the brain which have been unduly exercised.

A man, for instance, spends the greater part of his life in the pursuit of wealth. He leaves his office at evening, but takes his business home with him, carries it to bed with him, thinks of it till tired nature forces sleep upon him, and then it is even with him in his dreams. Frequently, however, he does not sleep, but lies awake hour after hour revolving in his mind all the schemes of the day before and devising new ones for the morrow. In such a case he is burning his candle at both ends, and the day is not far distant when he will have no candle to burn. He goes to his work in the morning ill prepared for either physical or mental exertion, for sleep, that period of life during which the brain repairs the damage that it has received during the day, has either not visited his eyes at all or has come in fitful slumbers that have done him little good. Is it a matter for astonishment that after weeks, and months, and years of such a life, mental decay in some form or other should make its appearance, and that the victim should die outright, or should pass the few remaining years of life within the walls of a lunatic asylum?

Undoubtedly the brain is strong and is capable of doing a great deal of work, and even in many cases resisting the bad treatment to which it is often subjected. It is not frequently the case that the brain suffers from good, honest intellectual work. It is the undue exercise of the emotions that break it down, and unfortunately the work of the present day can scarcely be accomplished without some one or more of the emotions being brought into inordinate action, and, according to my experience, the emotion that affects it most injuriously is anxiety.

Those men suffer less in the brain and nervous system who are able to cast aside all thoughts of business the moment the time for evening work has come. It is those who carry their business home with them, and who allow it to fill their minds when they should be seeking recreation, who suffer the most. It is those who are able to cast off all business cares when their offices are closed, and who spend their evenings in work of a different character from that in which they have been engaged through the day, or, better still, who pass several hours in rational amusements, who are most likely to escape headaches, insomnia and insanity, and to die after a long life in full possession of their mental faculties.

This is only one means for getting overworked brains out of the rut in which they have toiled. Horseback-riding, driving, gymnastic exercises, are always of great use, and we should hear much less of softening of the brain, broken-down nervous systems and insanity if these organs were more frequently brought into use. The brain-worker who divides the day into three portions, taking eight hours for sleep, eight hours for business and eight hours for satisfying his meals and recreation, will be pretty certain to keep his mental faculties in full vigor till he has passed far beyond the age of threescore years and ten.

CELERY FOR RHEUMATISM.—The Leeds (England) *Mercury* is responsible for the following: New discoveries—or what claim to be discoveries—of the healing virtues of plants are continually being made. One of the latest is that celery is a cure for rheumatism; indeed, it is asserted that the disease is impossible if the vegetable be cooked and freely eaten. The fact that it is always put on the table raw prevents its therapeutic powers from being known. The celery should be cut into bite, boiled in water until soft and the water drunk by the patient. Put new milk, with a little flour and nutmeg, into a saucepan with the boiled celery, serve it warm with pieces of toast, eat it with potatoes, and the painful ailment will soon yield. Such is the declaration of a physician who has again and again tried the experiment and with uniform success. He adds that cold

or damp never produces but simply develops the disease, of which acid blood is the primary and sustaining cause, and that while the blood is alkaline there can be neither rheumatism nor gout. Statistics show that in one year (1876) 2640 persons died of rheumatism in this country, and every case, it is claimed, might have been cured or prevented by the adoption of the remedy mentioned. At least two-thirds of the cases named heart disease are ascribed to rheumatism and its agonizing ally, gout. Smallpox, so much dreaded, is not half so destructive as rheumatism, which, it is maintained by many physicians, can be prevented by obeying nature's laws in diet. But, if you have incurred it, boiled celery is pronounced unhesitatingly to be a specific. The proper way to eat celery is to have it cooked as a vegetable after the manner above described. The writer makes constant use of it in this way. Try it once, and you would sooner do without any vegetables, with the single exception of the potato, rather than celery. Cooked celery is a delicious dish for the table, and the most conducive to health of any vegetable that can be mentioned.

MEDICINAL VALUE OF BUTTERMILK.—Through the simplest remedies relief often comes, and one of the new methods of medicating a patient by food may be found in carrying out this formula, as was successfully practiced in General Sheridan's case. Lactic acid, which is not far off from the leverage commonly called buttermilk, has been doing peptic wonders, it is announced. A good many people who are "out of sorts" with liver trouble might try the buttermilk cure direct without waiting for an illness to have it prescribed for them. Especially old people and worn-out people frequently find a fountain of youth in the churn's surplus. —*Philadelphia Ledger*.

USEFUL INFORMATION.

The Manufacture of Mortar.

Very much in regard to the durability of a building depends on having the mortar made on correct scientific principles. Both the durability and safety of buildings depend largely upon the character of the mortar which is put into them. Brick buildings and those not very old are often seen, from which the dry and hardened mortar could easily be picked by the fingers from between the bricks. There is one advantage to be derived from the use of such mortar; if the building tumbles down, or if it is pulled down, there is but little trouble or expense in picking the mortar from the bricks preparatory to putting it up again.

Mortar is often prepared by persons not properly skilled in such work. In order to secure mortar always good and uniform, an idea has been developed in Germany in the shape of the manufacture of mortar by machinery in large quantities to be delivered to contractors or individuals as required for use. About 2,000,000 barrels were disposed of on this plan last year. The idea is a good one and might well be put in practice in all large cities. A brick wall, if put up with the right kind of mortar, will be solid and almost homogeneous, as likely to break through the middle of the bricks as at the joints. Such a building will never tumble down except under great strain, and will even withstand a pretty severe earthquake shock.

An old builder of nearly 40 years' experience in making mortar, writing upon the subject to a contemporary, very justly says: "The mere matter of lacking lime does not make mortar out of it. Lime and water alone will not make any better mortar than sand and water." He suggests the use of plenty of water in lacking the lime, so that when it is run out of the box into the bed it will not bake or burn, as it is liable to do if not well watered. The mortar-bed should be made large and tight, so that there will be no leakage of the lime-water. The proportions should be about 50 yards of good sand to 25 barrels of lime for the first mixing, which should be thoroughly done. The hair should be put into the lime before mixing in the sand. After the mortar has been worked in the above proportions for ten days or more, if the amount of materials given has been used, 25 to 50 loads of sand may be added and worked in. It is said that the water that rises on a bushel of lacked lime, and where plenty of water has been used, if removed and put on a sharp sand, will make better stone than lime and sand mixed, showing that the water should be retained in the lime and sand while it is fresh, and that the mortar should be tempered in its own liquor. Of course where smaller quantities are used the proportion should be retained both at the first mixing and in the sand added subsequently.

USEFUL COLORS.—A variety of useful colors and dyes, says the *Oil Trade Reporter*, may be obtained from common plants growing in abundance everywhere. The huckleberry or blueberry, boiled with a little alum and a solution of copperas, will develop an excellent blue color; treated in the same manner with solution of nutgalls, they produce a clear dark-brown tint; while with alum, verdigris, and eal ammoniac various shades of purple and red can be obtained. The fruit of the elder will also produce a blue color when treated with alum. The privet, boiled in a solution of salt, furnishes a serviceable color, and the over-ripe berries yield

a red. The seeds of the common harning bush, when treated with sal ammoniac, produce a beautiful purple red. The bark of the currant bush treated with a solution of alum produces a brown. Yellow is obtained from the bark of the apple tree, the box, the ash, the buckthorn, poplar, elm, etc., when boiled in water and treated with alum. A lively green is furnished by the broom-corn.

THE OIL ROCKET AS A DEFENSE AGAINST SHIPWRECK.—Results of the scientific test of an oil rocket designed to calm the raging of a troubled sea appear to have been satisfactory enough to warrant the hope that shipwrecks will be rare occurrences ere many years. Four rockets, the same in appearance as those commonly used in ordinary pyrotechnical displays, but with the exploding-cap removed and a light tin cylinder holding one pound of train oil substituted, were sent up at varying angles of projection, the result being that the sea was calmed for thousands of feet around about the spot above which they exploded and fell. The oil spread into a thin, silk-like sheet, which, extending rapidly, appeared to have the power of keeping the waves within passable limits. Through the center of the oil runs a small tube containing two ounces of gunpowder, which ignites as soon as the motive-power of the rocket is spent, and, exploding, scatters the oil in a fine spray over the water. The action of the oil upon the water is almost instantaneous. *Philadelphia Times*.

CULTIVATE THE USE OF THE LEFT HAND. Many are the advantages missed by the non-cultivation of the left hand. Occasionally an artisan is seen who is equally able to handle tools with either hand. Such a one has constant advantages over his fellows, not only in the avoidance of fatigue, but in doing nice work and overcoming with ease difficulties that present themselves to those skilled with only one hand. The man who can use a hammer or knife, or perform any other feat with the left hand at the same time that the right hand is busy, will find frequent occasion to exercise his skill. Another and important reason for training the left hand to act with as great ease and precision as possible is, that if injury occurs to the right hand, the left can exercise readily all the functions possible to one hand unaided. By training the left hand in youth one would be spared, in such a case, from spending much valuable time in educating muscles hardened by age and unaccustomed to obey the mandates of the will.

FISH LIVING IN HOT WATER.—There is a pond on the hay ranch at Golconda which is fed by the water from the hot springs. This pond has an area of two or three acres, and the temperature of the water is about 85°, and in some places where the hot water bubbles up from the bottom the temperature is almost up to a boiling point. Recently a discovery has been made that this warm lake is literally alive with carp, some of which are more than a foot long. All efforts to catch them with a hook and line have failed, as they will not touch the most tempting bait. A few of them have been shot, and, contrary to the general supposition, the fish was hard and palatable. How the fish got into the lake is a mystery unsolved. Within 100 feet of it are springs which are boiling hot, and the ranchers in the vicinity use the water to scald hogs in the hutching season.

ECONOMY IN THE USE OF SUGAR.—All house keepers should know that crystallized sugar when pulverized, loses much of its saccharine quality. Granulated sugar, which is sugar crystallized directly from the vacuum pan, will go much further in "sweetening" anything with which it may be mixed than powdered sugar, which consists of crystallized sugar pulverized. Again, sugar boiled with an acid, if it be but three minutes, will be converted into glucose, which is the form of sugar found in sweet apples and grapes. One pound of sugar has as much sweetening power as 2½ pounds of glucose. In other words, one pound of sugar stirred into the fruit, after it is cooked and while yet warm, will make the fruit as sweet as 2½ pounds added while the fruit is boiling.

THE CALIFORNIA LION. says a correspondent of *Forest and Stream*, who has had considerable experience with the varmints, is naturally a great coward. He says: "I have known one to get into a sheep corral in the night and kill from 20 to 30 sheep, and before an hour's sun the next morning to be treed by a little 'yaller dog' and killed with less trouble and time than it would take to kill a red squirrel." He says he has known them to climb a perfectly straight tree only 18 inches in diameter and 20 feet to the first branch to get away from a common hunting dog. They will, sometimes, when pushed by dogs in a dense wood, jump from one tree to another to baffle their pursuers.

SAWDUST FOR FUEL.—Sawdust is now used for fuel at the Bath, Me., electric-light station, supplied from M. G. Shaw & Son's sawmill through an iron pipe one foot in diameter, which runs from the saw-pit to the station. A powerful artificial draught is established through this conductor, and the dust is blown from one building to the other. This new departure enables the station to secure an abundance of cheap fuel landed directly before the furnaces, and gives the sawmill a chance to get some profit out of material which was comparatively worthless.

ENGINEERING NOTES.

THE OSCILLATIONS OF HIGH CHIMNEYS.—In the *Memoires de la Societe des Ingenieurs Civils* particulars are given of the oscillations of a chimney stack near Marseilles, 35m. (115 feet) high, with an exterior diameter at the top of 1.22 m. (4 feet). During a severe storm it was determined, by observing the shadow of the chimney, that its greatest oscillation was half a meter (nearly one foot eight inches). It was further observed that a chimney set in motion by a gust of wind oscillates from four to five times backward and forward until it is at rest again. M. E. Burgh asserts that should this momentum during the oscillations of a chimney repeat itself in such a manner that its direction coincides with that of the oscillation, the overthrow of the chimney may be expected. This is the explanation given for the destruction of many a chimney constructed in accordance with sound principles of stability. Another German technical journal adds to this statement the qualification that in the case of a chimney near Vienna, 50 m. (164 feet) high and constructed of concentric (hollow) rings, with an inner diameter at the top of 2 m. (6½ feet), which is exposed to considerable gusts of wind, the oscillations were most carefully and repeatedly measured with a theodolite, when the observations showed an extreme oscillation of only 16 cm. (6½ inches) during severe storms.

TESTING FOR FOUNDATIONS.—The foundation of the Congressional Library building, now being erected at Washington, will be required to stand a pressure of 2½ tons per square foot. It was deemed of the utmost importance to test every foot of ground supporting the foundation walls. For this purpose a traveling testing machine was constructed. The method of testing the soil and putting in these concrete foundations may be briefly described as follows: First, the trench excavations are made by the contractor to the width and depth required by the plans, the bottom of the trenches being made perfectly level. Then the testing machine, consisting of a car bearing the required amount of weight in pig lead for making the tests, is placed in the trenches upon iron rails which rest upon four cast-iron pedestals, the latter being set four feet apart each way, each pedestal covering one foot of ground. Thus, one-fourth of the entire weight borne by the car rests upon each one of the pedestals, and the precise weight sustained by each square foot of ground is exactly determined. The soil being thus tested as to its resisting strength is then ready to receive the concrete foundations.

DIRECT CONNECTION.—Russia has commenced the important work of connecting the peninsula of the Crimea with Russia by a railroad and canal. The canal will be about 75 miles in length, 65 feet broad and 12 feet deep. The \$35,000,000, which will be its cost, has been secured. This, like all the great works of improvement undertaken by the Russian Government, will also have an important military value. The voyage from Odessa to Mariopol is at present 434 sea miles long; through the canal it will be only 295. Once the canal is finished, it will be easy for Russia to send her ships from the Sea of Azov to Ochakow, to the mouth of the Dnieper and to Odessa, because they will no longer have to sail round the Crimea, and will not risk being captured by foreign ships in case of war. The chief commercial reason for building the canal is the necessity for getting coal from the Don districts for the Russian fleet.

A NEW PRINCIPLE IN PROPULSION.—The Italians have made use of a new principle for the propulsion of some of their fast gunboats and torpedo boats under construction. They have improved on the twin screws of modern steamships by the addition of a third screw moved by a separate shaft and set of engines. The three screws are placed in the angles of a triangular pyramid. There is one on each side of the rudder as usual, and the third is underneath, on a level with the keel-plate. It was claimed that the third screw increased the speed by fully a third, on account of the great gain in power from the deep immersion.

A CANAL ACROSS ITALY.—An Italian engineer, Signor Victor Brocca, has just completed the survey of the proposed canal across Italy, the object of which is to save the very long journey round Cape Leca. This canal would begin on the western side near Castro, on the Tyrrhenian sea, and reach the eastern coast at Fano, on the Adriatic. Its length would be about 189 miles, and its proposed breadth 110 yards, and its depth 40 feet. For the purposes of the canal it would be necessary to drain the two lakes, Bolsena and Trasimene. The assumed cost of this gigantic undertaking is set down at 20 million sterling.

WATER FOR PARIS.—A Swiss engineer has proposed a scheme for supplying Paris with water from Lake Neuchâtel, at an estimated cost of \$100,000,000. The aqueduct required would be 312 miles long, 22 miles of which would be a tunnel through the Jura mountains. As the lake is 1620 feet above the average level of the streets of Paris, the scheme includes a plan for using the surplus head to furnish power.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW LONDON.—Amador Ledger, Sept. 8: Sinking operations at this promising mine were completed this week. The shaft is down over 1200 feet, and drifting has been commenced at this depth.

MISCELLANEOUS.—The Gillick mine has been started up once more. Hoisting machinery is being erected on the property, and everything indicates that thorough prospecting will be done. There is no mining worth speaking of being done at Volcano at present. The Volcano Gold Gravel Co. is operating on a small scale. The Grass Valley gravel claim is idle for lack of water. The water failed upon them so suddenly this season that they were unable to complete cleaning up. Negotiations are now in progress for the sale of the Amador Queen property to the Minear Co. The price is said to be \$125,000.

PLYMOUTH CONSOLIDATED.—It is now definitely stated that this property will be opened between now and the 15th instant.

Mariposa.

BEAR VALLEY.—Mariposa News, Sept. 8: The shaft at the Winner, the recent find, is now down over 70 feet. The indications still continue good. The shaft will be continued to several hundred feet if the prospects justify it. The Red Cloud shaft is down 575 feet. Two six-inch pumps are used in pumping. The rock in the bottom looks well. The Bonduand mine has commenced work again with a small force. They are putting up an upraise from the main shaft to the surface preparatory to erecting hoisting works.

NOTES.—The new quartz mine recently discovered at Bear Valley still shows good indications. The shaft is down over 70 feet. The vein is from three to five feet, and in good milling ore. The Vanderbilt mine is shut down at present on account of scarcity of water. Two shafts are now at work on the Groves & Ellingham shaft at Whitlocks.

Nevada.

THE EL DORADO.—Nevada City Herald, Aug. 27: The principal owners of the stock in the El Dorado mine are residents of this city. The El Dorado is situated in the famous Delhi section, near Columbia hill, but this town feels a lively interest in its development, for it is confidently expected it will prove a good mine. The owners have patiently stuck to the work of development under very discouraging circumstances, but now feel they are near the ledge with the long, hard-rock tunnel they have been driving for the past eight months. The rock in the face is softer and full of clay seams, which change indicates a near approach to the ledge. G. J. Brand promises to serenade the camp with a brass band if the ledge at the point struck is as favorable as all the indications promise it will be.

NORTH BANNER MINE.—Grass Valley Union, Sept. 8: Good progress is being made on the new mill of the North Banner Company. It will be a 10-stamp mill, and located below the mouth of the tunnel, so that the ore can be run directly from the tunnel to the dump in front of the batteries. Five stamps of the old mill will be utilized in the new mill, but little else of the structure will be used. The mill, which will have the latest improvements, will be driven by water-power under pressure by a Pelton wheel. Pelton wheels will also be used for raising the ore and pumping in the mine. There will be five of these wheels in all used about the works.

BRUNSWICK MILL.—Grass Valley Union, Sept. 7: The mill of the Brunswick Mining Co., which has been working for several days in preparation, was started up with the full head of ten stamps. There is on the dump between 200 and 300 tons of quartz, and the ground that is opened in the mine will enable the working force to keep the mill going regularly. The quartz that is on the dump is of fair milling quality, and favorable cleanups are anticipated.

Placer.

GRAY EAGLE.—Placer Argus, Sept. 1: Things are progressing in good shape at the Gray Eagle mine at Spring Garden. The shaft is down 340 feet, making it the deepest on the divide sunk from the surface. The shaft is nine feet in the clear, in two compartments—one of five feet for hoisting and the other four feet for pumps and ladder. The machinery consists of three boilers of 60-horse power, a single drum-friction hoisting engine, with 600 feet of wire cable, an 18-inch blower and six pumps. At a depth of 230 feet there is a T drift 16 feet back, then 30 feet long at right angles. This is dug down about six feet and is used as a reservoir. There are about 14 inches of water in the mine, most of which is caught at the level. Three pumps are stationed here—two in action and one in reserve, and another is placed at the bottom.

Plumas.

THE GLAZIER MINE.—Greenville Bulletin, Sept. 5: Dick White is in town from the Glazier mine, on North Fork, and reports very rich gravel. The lower tunnel is in nearly 500 feet. At the end of this tunnel an upraise of 17 feet was made, striking into gravel that is very rich in coarse and fine gold. Although the gravel is cemented and very hard, it pays from \$10 to \$20 to the man. Some of the pieces are very large, one of them containing \$26. The channel is from 100 to 200 feet wide. It is a part of an ancient river-bed, evidently cut into by the present North Fork of the Feather river. At the lower end of Big Flat is Meeker Flat, where a man named Meeker and Jobe T. Taylor took out large quantities of gold in 1852 or 1853. This is dug down below this break, Nick Meadows, in a small claim, has taken out, it is estimated, between \$10,000 and \$14,000. Above the Glazier and on the opposite side of the present river, two claims are located on the channel, while five claims cover that part of Big Flat not occupied by the Glazier, whose length is 1½ miles. Here is a chance for one of the richest and largest mining operations in the State.

Sierra.

THE KEYSTONE.—Tribune, Sept. 7: Four men are employed at the Keystone mine by its owner, M. H. Mead. These hands are engaged in putting

through an upraise to the surface and taking out ore for the winter run. It is very probable that inside of another year this mine will be worked on an extensive scale. The Bunker Hill mine, situated near the head of Poorman's creek, is employing 30 men and taking out gravel that pays from \$3.75 to \$4.50 a carload. It is predicted that an immense amount of money will be taken out of the mine during the next year. At the Gold Lake mine, owned by Messrs. Willoughby, Jones and others, the tunnel has been run about 150 feet on the ledge, and the rock prospects well the entire distance.

MEADOW LAKE.—Fred Morris, the newly-installed superintendent of the Marguerite mine at this place, and A. W. Gove came down from Meadow lake last Saturday with a 55-ounce bar of gold (value \$1028.50), the result of the last 11 days' run with ten stamps at the Excelsior mine. This is the last run that will be made there this season with the exception of 20 tons of ore which Jim Hill and Watt Hughes propose to have crushed from their claim. It is found necessary to hang up the mill, owing to the fact that enough dry wood cannot now be obtained to carry them through the winter.

Shasta.

FOSTER MILL.—Shasta Courier, Sept. 8: The burning of the Foster mill at Bullyhoop is quite a setback to that long-delayed district, so rich in mineral wealth and so poor in ready capital.

IRON MOUNTAIN.—Iron Mountain Main Works have shut down, hands paid off and discharged. We understand that this cessation is but temporary in order to repair and replace machinery impaired by use for months past. A mine from which \$10,000 bullion per week is taken is not a failure.

Siskiyou.

FROM THE MINES.—Yreka Journal, Sept. 12: All the river claims on Klamath river in the Honolulu district, north of this place, are paying well this season, and the companies are taking out considerable dust to pay up their debts and get something over. The Phil Mott Company cleaned up 360 ounces from their last cut and are now sinking down on another cut which will pay still better, as the channel was very rich where they quit work in last cut. The Centennial Company made a good clean-up from their last cut and are now sinking down a new cut with still better prospects. The several other companies along the Klamath are all taking out considerable gold and expect to be able to realize a greater amount this season than for many years past, if not driven out by high water and heavy storms before December. The claims above Honolulu, all the way to Henley, are also paying better this season than usual. The Schroeder & Werner quartz ledges, at head of Deadwood creek, are reported as paying handsomely, and a large force is kept constantly employed in getting out quartz and running the mill. The Mountain Boomer quartz mine at New River, in Trinity county, prospects exceedingly rich at present. A tunnel has been run in the mountain from the end of which two drifts have been extended 200 feet each way, also four raises 100 feet apart and 150 feet high, all exposing very rich quartz. About 150 feet below this tunnel another tunnel 150 feet long has been run in to tap the ledge, where the quartz is equally as rich as in the upper level. At Know Nothing creek, in this county, on this side of the New River divide, all the quartz ledges are looking splendid and promise big pay when thoroughly opened. Mr. Clark has a good ledge which contains rich quartz promising a big yield as soon as the winter rains afford water for running the mills. The Know Nothing Company, now building a mill, expects to take out big pay during the coming winter. All the companies at Know Nothing creek, New River, and the tributaries of the Salmon and Trinity rivers along the boundary of this and Trinity county, have their dumps full of quartz, besides considerable piled up outside, awaiting the winter rains to furnish water for the batteries and motive-power for running the mills.

Trinity.

NEW STRIKE.—Trinity Journal, Sept. 8: A good strike was made last week in the prospecting tunnel which is being run on the Lone Jack mine, East Fork district. The tunnel was commenced two years ago but was not pushed till recently. Men driving ahead struck a 2½-foot ledge of good working ore, which shows every indication of a permanent vein. Heretofore the ledge has been broken. The Lone Jack is the pioneer ledge of the district, and was discovered in '83. One crushing of ore from it by inexperienced hands averaged \$36 to the ton. The ledge is owned by the Enterprise Company, and the new strike will greatly enhance the value of their property.

Tuolumne.

MINING NOTES.—Union-Democrat, Sept. 1: Messrs. Oliver & Harriman went to the Bay Monday to get hoisting and pumping machinery for the Bonanza mine. Over 1000 feet of sheet-iron pipe has been received at Summerville for the Eureka Consolidated. It will average 12 inches in diameter. The Utica mine and mill at Angels, Chas. Lane superintendent, is doing splendidly; 40 stamps will shortly be added to the mill, making 60 in all. The crushing capacity will then be nearly 150 tons per day. Mr. Ferguson's quartz-mill at the water-works in Sonora was running this week on rock from the mine of Mr. Marshall, in the southern part of town. The Green mine, several miles northeast of the Excelsior hotel, has resumed operations. Properly opened and developed this mine would soon become a big success. Harry Kirk of Dr. Walker's mine, the Pine Nut, was in town Wednesday. He and James Fitzgerald are running a tunnel on the mine, and it is now in about 100 feet. Mr. Kirk reports the mine as looking well and presenting every indication of a permanent and valuable property. Chas. Smith and partner, Mr. Wilson of Brown's Flat, are getting a big prospect in their claim (the Brown mine) a short distance above the Flat. They are following down the main chute which has a fine crossing, attended by beautiful blue slate. The shaft is now a considerable depth below Wood's creek, but the hoisting and pumping machinery situated in the tunnel easily keep the water at bay. We are informed from reliable sources that the crushing of 65 tons of quartz from the Laura mine has been completed, and furthermore that it yielded over \$3000. The percentage of sulphurets will average 10 per cent—200 pounds to the ton. Lotus Page, the veteran prospector and mining man, was in Sonora Monday. He reports that his shaft at Saw Mill Flat requires con-

stant and intricate timbering to keep it from caving. The breaking of the ditch some time ago allowed the mine to fill with water, which so loosened the hanging wall as to necessitate extra expense and time in timbering. The Moffitt mine at Moffitt's Bridge is working a force of 30 men, and when the water is pumped out it will be increased to 50. The flume now carrying the river-water is about 900 feet in length and is thought to be the longest one in this county. Mr. Moffitt proposes as soon as he can get into the bed of the river to work entirely new group.

NOTES.—Union-Democrat, Sept. 8: Mr. Popovich and partners are striking it rich in their mine on Bald mountain. Mr. Crookshank is doing well with his mine on the Tuolumne river, several miles below Groveland. Mr. Fischer of Tuttle town has completed the construction of his mill at the Lennan mine, situated a short distance below, south and west of the Morris mill. Louis Blanding has tried his new treatment for copper plates at the Ferguson mill in Sonora. It keeps the plates as bright as if they were made of silver. No oxidation can take place and the process works to a charm. It is simple, astonishingly cheap and wonderfully effective. Johnny Hatvig has made arrangements to crush about 20 tons of ore at the Ferguson mill in Sonora. His mine is distant four miles from Sonora, but he feels that the quartz will pay for the trouble and expense. We are pleased to state that the Lane mine, almost within the city limits of Sonora, is looking exceedingly well. A sample of the ore coming from the Norwegian mine was yesterday shown us by Mr. Louis Blanding. It contains free gold in quantity, and is especially interesting from the fact it carries rich tellurides of gold, and silver as well, such as are found in the famous Bonanza mine, situated in the city of Sonora. The Norwegian mine is situated near Robinson's Ferry on the Stanislaus river, and has a 2-foot vein. It is being energetically worked by Messrs. Fischer and Rowe. We learn that Chauncey Wetmore has made arrangements to have a number of tons of quartz worked at the furnace and arrastra of Fred Sutton on Wood's creek. The character of quartz is precisely similar to that of the San Guiseppi mine, and the gold is largely sulphureted. Chauncey Wetmore has been developing the lead for some time, and now the shaft is down about 45 feet. The lode runs east and west, is on Negro gulch, and but a short distance from the Golden Gate mine.

NEVADA.

Washos District.

BELCHER.—Virginia Enterprise, Sept. 8: The 500 level east crosscut shows no change. Will stop this crosscut in a few days and start a drift from the Belcher shaft to connect with the Crown Point 200 level as soon as the surveys are completed. This will give an important connection in case of accident. At the same time it will prospect ground that has never been touched before. The shaft repairs are finished and are now engaged on the incline shaft. The Sutor tunnel drift is out 660 feet, having about 240 feet further to go to connect with the Crown Point 1300 level drift. There is about six weeks more work to connect.

CON. CAL. & VIRGINIA.—On the 1300 level continue retimbering the main south lateral drift. On the 1465 level, at a point in south lateral drift No. 2, 70 feet south from west crosscut No. 1, an east crosscut is advanced 25 feet. The formation is porphyry, with quartz carrying some value. Continue to extract usual quantity of good ore from the stopes east of the winze below this level. On the 1500 level are continuing to extract ore from the southeast drift run from the upraise above the parallel north drift, 58 feet above the track floor of this level. Work is resumed in the parallel north drift on this level, and it is extended a total length of 130 feet from the end of east crosscut No. 1. On the 1600 level continue to extract ore from the stopes around upraises Nos. 1, 3 and 4. Are also extracting some ore from the drift running south from the Ophir line, 36 feet above the track floor of this level. On the 1650 level, the upraise above the drift running south from the east drift from the Con. Va. shaft is up 45 feet. Ore is being stoped from the end of the south drift.

HALE & NORCROSS.—On account of scarcity of water the Nevada mill had to discontinue milling ore for us the first of this month. It worked for us during the month of August 2615 tons. The average of the battery assays was \$12.38 per ton. Have bullion on hand and previously shipped amounting to \$80,000. Complete returns have not yet been received from the Mint. The west drift on the 500 level has been advanced 50 feet, making its total distance 375 feet. Have started to open a new working station on the 800 level, from the vertical shaft.

GOULD & CURRY.—El Dorado level: East crosscut No. 1 from the end of main south drift has been advanced 35 feet in good milling ore. North drift started from west crosscut No. 2, through the old stopes, has been advanced 20 feet. The upraise 45 feet south of crosscut No. 2 has been carried up 28 feet; total height 101 feet. The top in low-grade ore. Drain tunnel: The main south level drift started from east crosscut No. 2, has been advanced 12 feet. Formation in quartz giving low assays.

CHOLLAR AND POTOSI.—The face of north drift No. 2 on the 650 level of Chollar is in clay and quartz of low grade. The old Potosi shaft between the 450 and 550 levels has been cleaned out and retimbered, giving good ventilation to those levels. They have commenced cutting out a new station in the Chollar shaft at the 750 level. In the Potosi mine there is no change in the character of the ground on the 650 level. Considerable work is being done repairing drifts, easing timbers, etc.

ANDES.—During the past week the north drift from the west drift on the 350 level advanced 80 feet in very good looking quartz, some of which assays very well. The east crosscut on the 240 level advanced 7 feet through very hard rock that requires constant blasting, being a mixture of clay and porphyry.

CROWN POINT.—The 700 level south drift from the crosscut advanced 22 feet during the week, making a total length of 78 feet. There is no change to report in the ground. A crosscut has just been started on the 700 level running west, which is expected to reach the ledge within 30 feet.

SAVAGE.—Have finished retimbering 149 feet of the vertical shaft and are now putting in guides.

The south drift on the 500 level has been advanced 38 feet and continues in fair-grade ore. Are running prospect drifts and easing timbers on the several levels of the mine.

BEST & BELCHER.—El Dorado level: West crosscut No. 1, from main northwest drift, has been extended 34 feet; total length, 116 feet. Formation clay and quartz. The main northwest drift has been advanced from west crosscut No. 1, 12 feet. The face is porphyry.

ALTA.—Are extracting the usual quantity of ore from the 825 level, which is being concentrated at the mill. Sinking on the Keystone vein to meet the upraise is progressing favorably; also work of cross-cutting from Alta shaft.

ALPHA AND EXCHEQUER.—On the 382 level of Alpha the northeast crosscut is in 60 feet. On the 500 level the station is in and timbered 28 feet. The east drift is in 25 feet in hard porphyry and quartz.

WEST YELLOW JACKET.—Have been at work temporarily and started to drift at another point. Clay wall carrying quartz in this drift. Will crosscut from this drift after it is advanced properly.

OCCIDENTAL.—On the 48 and 100 levels are stopping ore from these points. Have extracted and shipped to the Atlanta mill 137½ tons. Assay of wagon samples, \$30 per ton.

UTAH CON.—472 level: The east crosscut has been extended 63 feet; total length, 95 feet. The formation is vein porphyry, showing streaks of quartz and some clay.

SEG. BELCHER.—Have advanced the south raise 24 feet since last report, making its total height 74 feet above the track floor. The ground is softer and breaking better.

YELLOW JACKET.—A large force of men is at work repairing and putting a new foundation under the machinery of the hoisting works. The work is progressing fast.

CONFIDENCE AND CHALLENGE.—Only work of repairing and retimbering is being done. The men reach the mine through the Crown Point shaft.

MEXICAN.—On the 1465 level a joint Union drift started from the east drift of the Ophir shaft at a point 150 feet in, is advanced 188 feet.

SIERRA NEVADA.—On the 520 level east crosscut No. 3 is advanced 340 feet. It is still in porphyry with clay slips showing some water.

OPHIR.—On the 1465 level the old east drift from the shaft station is retimbered 165 feet. The shaft station is being repaired.

JUSTICE.—Are prospecting and hoisting ore from the 600 level. Work on the mill and hauling of material is progressing favorably.

BULLION.—Drifting south on the 640 level and crosscutting east on the 500 level, with no particular change to report.

SCORPION.—The south drift on the 500 level has been extended about 15 feet during the week.

BALTIMORE.—Are prospecting in the ledge on the 338. Upraise No. 2 continues to look well.

UNION CON.—Report is identical with that of Mexican.

IOWA.—There is nothing new to report this week.

Tuscarora District.

COMMONWEALTH.—Times-Review, Sept. 7: One hundred-foot level: No. 2 south drift has been extended 29 feet. It has reached the Queen line and a crosscut started to intersect with the upraise from the 150-foot level. The work of timbering the intermediate drift is progressing well. Some very high-grade ore is being extracted in cutting out for timbers. One hundred and fifty-foot level: No. 1 north drift from No. 1 west crosscut has been advanced 15 feet. No. 3 north drift from No. 1 east crosscut has been advanced 11 feet; the face is all in vein matter giving low assays. The east lateral drift has been advanced 8 feet. Have resumed sinking the No. 2 winze from east lateral. The bottom is showing very fine ore. A crosscut has been started near the south end line to connect main south drift with the east lateral. No. 2 west crosscut from main south drift has been advanced 26 feet. Two hundred and twenty-five-foot level: Main south drift has been extended 38 feet, cutting seams of ore assaying \$44 per ton.

NEVADA QUEEN.—The 450-foot level north drift has been extended 10 feet. Joint upraise at the line has been extended up 20 feet; total, 40 feet. The top is still showing very high-grade ore. The stopes are yielding a full supply of ore for the mill. Average assay from battery pulp \$203 per ton. Average assay from car samples \$28.20 per ton. The 100-foot level south drift of Commonwealth has reached the line and a crosscut started to connect with the joint upraise from 150-foot level. The 150-foot level south drift from Commonwealth has been extended 7 feet. The mill is running full capacity and doing good work. Shipped on the 5th inst, \$20,800.

NAYAJO.—The crosscut from south drift on the west vein, 350-foot level, extended 6 feet. North drift from No. 2 winze on east vein, 250-foot level, has been connected with No. 1 winze. The stopes on the 350-foot level are looking well and turning out some very high-grade ore.

FOUND TREASURE.—Southeast drift on south-west vein, 150-foot level, has been extended 10 feet. Stope from No. 3 upraise continues to yield high-grade ore. Southeast drift, 200-foot level, has been extended 20 feet. The face of the drift is showing some high-grade ore.

BELLE ISLE.—The east crosscut from the north drift, 250-foot level, extended 14 feet. The face looks favorable. Some high-grade ore has been taken from the stopes on this level.

DEL MONTE.—The combination shaft has been sunk and timbered 12 feet; total depth, 20 feet. The rock breaks well but is a little harder.

GRAND PRIZE.—All work in the mine has been suspended to admit of repairing the shaft, on which good progress is being made.

NORTH COMMONWEALTH.—The combination shaft has been sunk 12 feet cutting a small vein of chloide ore.

NORTH BELLE ISLE.—East crosscut No. 2 north, 300-foot level, extended 6 feet. The joint upraise from the 400-foot level is up 40 feet and still shows a good width of very high-grade ore. The usual amount of high-grade ore has been taken from the stopes. The machinery in the concentrating works

is being rapidly placed in position. Good progress is being made with the grade for the Union mill.

ARIZONA.

HASSAYAMPA DISTRICT.—This district being of large size, centrally located, easy of access and the most productive in early days of placer gold, naturally has been more carefully prospected for mineral than almost any other in the Territory. Its principal stream, Hassayampa creek, heads in springs on the western side of Mt. Union and the south side of divide between it and Lynx creek and flows west for 12 or 14 miles, and then nearly south for 100 miles, emptying into the Gila river some 30 miles west of the City of Phoenix. All of the country drained by its headwaters is embraced in the Hassayampa mining district, except the Groom Creek district spoken of in the last letter. The district is nearly 20 miles square. From the eastern and southern side the creek is fed by Maple, Boggs' gulch, Jennings' gulch, Slate creek, Ash creek and the East Fork. From the north and west by Little Creek, Groom creek, Indian creek, Big and Little Copper creeks and Catochin gulch. The district is well watered for Arizona. Most of the streams mentioned are running ones the larger portion of the year, and all the mines opened to any depth worth speaking of. The predominating rock is granite and slate, with large belts of porphyry and quartzite at intervals. The main mineral veins run northeast and southwest, but there are cross veins running in every direction. The main creek and most of its tributaries have been mined extensively for placer gold, and all the mineral veins in the district, whether called silver, copper or lead mines, carry an appreciable quantity of gold in their ores. From Mt. Union the Sierra Prieta range of mountains swing round in a half circle, open to the north, in which concavity is the basin of Granite creek and the City of Prescott. All along the west and north line of the range the mountains break off very suddenly down to the valleys called Skull, Kirkland and Walnut Grove. South from Mt. Union a high range, known as the Turkey mountains, extends 20 miles to the Bradshaw mountains, forming the division line between Hassayampa and Turkey Creek mining districts. The range seems also to be a dividing backbone between two mineral belts, being itself comparatively barren—Big Bug, Turkey Creek and Black Canyon districts being on the east side of the range, Hassayampa and Walnut Grove on the west. A miner in Phoenix claims to have discovered the old Spanish silver mine worked 300 years ago. He locates it near the Grand canyon.

COLORADO.

AMONG THE MINES.—Silverton *Miner*, Sept. 1: The Buckeye is advertising for bids for several hundred feet of drifting. The Maid of the Mist machinery has arrived. The Stadacona on Sultan is being worked by a small force. The Climax is sinking the shaft and the company is shipping heavy galena from the Lost Boy. Hunt & Bell have struck a solid streak of gray copper in the Nevada at Guld. Henry Schlicker has struck some pretty good ore in the Theresa No. 1. The Mountain Queen begins regular shipments the coming week. The ore strike has changed to solid gray copper, averaging 110 ozs. The Bismark lode, a short distance from the Simpson mill above Gladstone, is showing up some fine bluish and gray copper. The tunnel is in 75 feet. The Saxon mine in Poughkeepsie gulch has been sold to a St. Louis syndicate, by John J. Myers of Ouray. The deed was placed on record this week and marks the consideration at \$50,000. The Wheeler Bros. own the Harrison lode above Gladstone. They are just about to complete a 150-foot crosscut, which will cut the vein 85 feet deep. A. H. Bridgman and W. W. Reese, who have a sub-lease on the Bear, struck 110 ounces this week in the drift. Capt. Handy brought over from Swamp canyon one of the finest gold specimens ever seen in the country. The rock was as large as two fists and contained at least half a pound of pure gold. It was sent to Denver to be exhibited. The richest mine in the San Juan is the Sunnyside Extension. It has a 40-foot winze, the ore taken out in the sink of which netted \$14,000, while the value of the ore opened up throughout the mine is simply wonderful. The product is mainly gold. The Auburn, opposite the village of Middleto in Tower mountain, is showing up well. The mine has 300 feet of development, all drifting on the vein. It is very desirable ore for smelting, the contents being 99 1/2 per cent lead and 90 ounces silver. Geo. Fisher, who has had the lease on the great Sheridan mine in Marshall basin, informs a reporter that he has secured an extension of the lease for three years more. A vast quantity of coal will be taken over the range to this and other mines in the basin this fall, and Mr. Fisher adds that they will be operated the coming winter on a more extensive scale than ever. All of the high-grade ore is now going to market by way of Silverton. The North Star on Solomon is in bonanza again. The drift is run between the two ore streaks, and about 20 feet from the shaft the vein was crossed, opening out three feet of solid gray copper worth \$300 per ton. Last year \$270,000 was taken from this shaft on the sixth level, but the water drove them out.

GLENWOOD.—The El Paso is erecting ore bins at its shaft-house and probably will begin shipping soon. The lessees of the Four Per Cent are still drifting south on the small streak of ore which was struck some time ago, and it has not yet opened sufficiently to make it of much account. The Adams mill is in operation again, running on low-grade ore from the Brooklyn shaft. The Adams has not increased its shipments much, but will begin to produce more ore this week. The lessees of the Mike and Starr are still working in the lower level under the ore body, doing development work in order to command it. A raise from the lower level is expected to run into the ore some time next week. The Virginus is shipping now 60 tons of argentiferous iron per day. The iron is of very low grade and much of it nets over \$2 per ton. The Virginus should pay good interest on its purchase price out of its own iron body alone. The winze from the lower level of the Minnie went down 25 feet, when water began to run in and further sinking was prevented. This makes the total thickness of the Minnie's ore body at this point, so far as opened, about 150 feet. No further prospecting work will be done in this direction for the present, but eventually one of the shafts

will be sunk deeper. The Minnie is at present shipping about 75 tons of ore per day. Shipping will be increased very soon if the price of lead holds above \$1 25. The Colonel Sellers mine is said to have more ore in sight at the present time than at any time for five years. The character of the ore now being mined is less zincy than it has been for some time, and carries a higher percentage of lead. Very good lead ore is being taken from all parts of the mine, which is shipping 75 tons of ore per day; average 40 per cent lead. The concentrating-mill is running regularly and dressing about 50 tons of low-grade ore per day; assays from 12 to 15 per cent ore. The mill should be very profitable when supplied with this class of ore. It was formerly run on ore not one-fourth as good. Three and one-half tons are concentrated into good, and about 15 tons of concentrates per day are produced.

ABOUT SILVER CITY.—*Enterprise*, Aug. 31: The Mountain King at Pinos Altos is showing up well, a vein having been found that seems extensive and permanent. The Flagler is now running night and day, smelting about 17 tons daily of copper ore from Ilanover. It is expected that 27 tons will soon be the daily work. T. B. Pheby kept three Chinamen working at the mill and on the dumps but a few days, and did not intend to keep them permanently. It would be a misfortune for any considerable number of Chinese to get a hold in the mines. McKnight & Warnock's Silver Belt in San Domingo gulch, Pinos Altos district, is down 32 feet; has a 3-foot vein of silver-bearing ore, samples of which are as rich as can be seen anywhere, being plastered over with native silver. A streak of free gold ore has been encountered at 31 feet. The Socorro *Chief*, speaking of parties who search for the Adams diggings, says: One the *Chieftain* knows of, and it has been out for the past six months under the captaincy of Pioneer Patterson, an intimate acquaintance of Adams and a firm believer in the story of the lost treasure. Mr. Patterson is a thorough mountaineer and practical miner, and if the Adams diggings exist he will find them. A carload of ore from the Oakland mine, in the Silver Creek district, has been sent to Denver. It is expected to average \$250 per ton. The mine shows a 4-foot ledge, and a carload of ore will be shipped weekly hereafter.

DAKOTA.

CALEDONIA.—*Deadwood Pioneer*, Sept. 5: The 20 new stamps, making in all 80 with which the mill is now equipped, begin dropping on Caledonia ore this morning. The increased milling capacity cannot fail to add appreciably to the monthly bullion output of the property, while the additional cost for operating will be insignificant.

IDAHO.

THE SIERRA NEVADA.—*Wardner News*, Sept. 1: The chief work now in progress in the Sierra Nevada mine is confined to tunnels A and B. In the last named a large amount of stowing work is being done, and a number of men are employed in opening up new ground. As depth is attained a much higher grade of ore is encountered and the recent developments are of a most satisfactory nature. The water in the ditch is very low just now, and a supply from the mine has of late been utilized in running the works. Fifty-one men are on the company's payroll.

PALMER FRACTION.—The Palmer Fraction adjoining the Sierra Nevada is a claim that promises in the near future to yield rich returns to its owners. Their shaft is down 124 feet; and at a depth of 118 feet cut the vein.

CONCENTRATING WORKS.—The massive machinery of the Poorman concentrating works was put in motion for the first time last Monday. Everything worked like a charm and Superintendent Clark feels satisfied he has a mill at his command that will meet the requirements of the great ore-producing property under his control. The hoisting machinery for the mine arrived from New York on Wednesday and will be brought into requisition immediately. The force engaged in the construction of the Granite concentrator on Canyon creek has been reduced to six men, the company not desiring to have the work completed until the erection of the tramway is finished.

NEW MEXICO.

MINES AT ASPEN.—*Republican*, Sept. 3: The Regent has awarded the contract for the handling of its output for 60 days to the Rust sampler, and is now delivering 75 tons a day. The contract calls for 4500 tons to be delivered within the time mentioned, and from the figures alone is to be derived a fair idea of the magnitude of the property. The grade of the ore is said to have been improved by the recent developments. The Aspen is handling nearly 70 tons of mineral that affords excellent returns each day. The ore bodies in the Mollie Gibson are increasing at each shift, proclaiming the property one of the largest that has been proven on Smuggler mountain. The assays indicate a variation in the grade of mineral from 50 to several thousand ounces, a portion of the vein being heavily impregnated with native silver. Manager Bulkeley of the Aspen Mining and Smelting Company is now handling large amounts of very fine-grade mineral that is being divided between several rival smelters. The Enterprise is extracting considerable mineral from the locality of the new strike. The output in all of the producers is said to be showing an increase the present month. The owners of the Cora L. are shipping some high-grade ore from superficial workings. The strike in the San Jacinto is improving with each shift, and the main ore-body is expected each day.

NOTES.—Silver City *Enterprise*, Sept. 7: The last car of concentrates shipped by the Mountain Key Company netted \$3809. A Mexican named Jose Saleva and two sons are washing out \$25 per day in one of the placer gulches of Pinos Altos. There are now regularly employed in the mines of Pinos Altos 414 men. The different payrolls amount to over \$40,000. Andy Stewart is said to be taking out good ore from the Peerless. As rich ore as has ever been taken out of the Bremen mine is now exposed in several openings, and the future of the mine was never more promising than at the present. Nick Rascom started for the Julian mine in Cow Springs district, to take out ore for the

Flagler works, on last Wednesday. An average sample of 150 pounds of the ore, made by the assayer of the works, gave returns of 12 1/2 per cent copper, \$15 in gold and 10 ounces in silver, and \$32 per ton is offered for the ore at the works. It again looks as though Georgetown is to push to the front as the banner camp of the county. Fully 100 men are employed in the mines. About 65 of this number are engaged by Thos. B. Pheby, while others are distributed on the different leases. The amount of ore taken out is surprising. Mr. Pheby alone producing fully \$1000 in silver a day, besides the concentrates he is making. Work is progressing slowly but very satisfactorily to the management at Telegraph. There are now 32 men on the payroll, and others will be put on as fast as possible. The greater portion of the work thus far done is on the Mother Lode claim, from which any quantity of low-grade ore can be broken, as the vein is about 8 feet in width. There are 22 men regularly employed on the Deep Down mine. In both drifts of the 200-foot level high-grade ore in quantity is being taken out. In the south drift eight inches of the richest ore yet found in the mine has been encountered, while in the north drift the vein is but six inches, but very rich. In the shaft there are ten inches of good ore. The run of 20 tons just completed averaged \$30 to the ton.

NOTES.—Kingston *Shift*, Aug. 25: The most important strike reported is that of the Charm, on the Sweepstakes hill, having found a contact full of rich ore. The Keystone on the North Percha and the Lady Franklin on the Bonanza hill, are both taking out ore from their deep-down shafts, and, with the Templar, never looked better. The problem as to whether ore was deep down in the Kingston camp has been solved. The Superior is preparing to resume work. Every mine that has ever shipped ore has it in sight to-day. The situation on the south, in the new Tierra Blanca precinct, improves, the Hornet and Log Cabin still being the center of attraction. The Superior is preparing to resume work with Gillette as superintendent. The Keystone looks better than ever. Ore on both ends of the lower level, which is 200 feet lower than the lowest workings on the Templar through the Equator tunnel, and still above water. A visit to the Enterprise mine gives a stranger the idea that we have a mining camp. The recent strike in the Templar and Keystone will certainly encourage all the mine-owners in that section, particularly the Iconoclast and Pride of the West, which join on the north and are supposed to be in the same belt. The Charm boys have struck the contact at the depth of 20 feet and find plenty of rich ore. John Johns and Dennis Findley truck a large body of ore last Thursday in their lease on the north end of the Hornet, which in breast is about four by seven feet. The Nevada Consolidated group of mines in the Black Range mining district, Sierra county, near Kingston, N. M., consisting of the Nevada, California, Path Finder and Veteran mines, has been purchased by a syndicate, composed of capitalists of Kansas City. This property has produced shipments of very high-grade ore and has paid for its discovery.

MONTANA.

MEAGHER'S MINES.—*Inter-Mountain*, Aug. 29: The Judge lead, situated on Mineral Hill, 15 miles east of White Sulphur springs, is rapidly developing into one of the best mines in Meagher county. The three men engaged in sinking a shaft on the ore chute are said to be hoisting \$1000 worth per day. The last accounts report ore on both sides of the Alice shaft, which will reach the depth of 100 feet this week. The Solid Silver, an extension to the Hidden Treasure, shows four inches of galena and over two feet of hard carbonate ore. The mining in the Castle mountains is steadily drifting toward Copperopolis, which promises to be the center of a very rich district.

NOTES.—*Mining Review*, Sept. 5: Coffee Bros. & Co. are engaged in hauling ore from the West Grass Valley to Silverman's sampling works, and have their ore-house full of fine carbonate and galena ore. The mine shows in the face of the 50-foot level two and a half feet of this same ore. A carload of ore was shipped about a week ago to Omaha from the Enterprise mine, located in the Stomple district, about three miles from Marysville. A cross-cut has been run which is in a fine body of ore. A new strike has been made in the Anna Maud mine at Strike. In the Carbonate mine, located three miles from Marysville, the tunnel is now in 225 feet, and the ore is improving with depth and running about \$60 per ton. Over in the gold belt east of Butte a number of mines have been worked, among them the Minnie Rand. This mine has paid from the grass roots. The Silver Spray mine, which has been idle for the past year, we understand will commence work shortly.

UTAH.

THE ONTARIO.—*Park Record*, Sept. 1: Work is progressing favorably at the 1200-foot level of the Ontario No. 2 shaft. The east drift is in over 130 feet and the ore body shows up well, though it is "pinched" a little since it was first struck. A flow of 200 gallons of water a minute is encountered, but it is pumped up to the 1000-foot level, where the Cornish pump receives it, without any difficulty.

MONTREAL DEVELOPMENTS.—The Montreal group, consisting of five claims in the lower part of Snake Creek district, is coming to the front as one of the bonanzas of the future. The property is worked by a tunnel running along the course of the ledge, and it is in about 335 feet already. At a point about 275 feet in from the mouth two crosscuts of 20 feet each were run, but no pay streak was encountered.

CAMP CROSSCUTS.—The Anchor tunnel is in about 450 feet, over two-thirds of the way. The Apex is making a shipment of over 50 tons of first-class ore through the Mackintosh sampler. Geo. Pierson's Red Oxide tunnel in Pioneer ridge is showing up well. The vein in the face is being followed up. Work in the Parish & McLaughlin shaft is confined now to crosscutting the formation in the lowest level. John Oldham is driving a tunnel on one of his claims on the north side of Bonanza flat. It is in about 30 feet, and in the face of the tunnel a fine seam of ore is exposed.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 249,200 pounds of concentrates and 290,650 pounds of first-class ore. For

the week just ended the Mackintosh sampler received 472,300 pounds of Ontario ore and 64,370 pounds of Daly ore. During the past week the Ontario shipped an aggregate of 49 bars of bullion, containing 28,111.12 fine ounces of silver. The product of Daly bullion from the Marsac mill for the past week was as follows: On the 26th, 10 bars, 10,512 ounces; 29th, 9 bars, 9300 ounces; and this morning, 8 bars, 8768 fine ounces of silver.

MINING MATTERS.—*Park Record*, Sept. 8: J. M. Kennelly has finished developments for the present on his Scott Hill claims, and he has put his men to work on the Rosebud, near the Great Basin. Buchanan's gold strike over on the Provo river is panning out a sort of silver lode. A late assay from there showed some 50 ounces of silver with no gold. The event of the week in mining circles is the rich strike in Woodside canyon. A couple of weeks ago Messrs. Drake, Farish & Williams took a year's lease on the Woodside property, owned principally by Hon. E. P. Ferry, and a thorough examination of the upper tunnel workings was made. A small seam of ore was traced toward the surface, and while Mr. Williams was returning from the Morgan lake with Mr. Drake, the supposed course of the ledge was traversed. As romantic as it is, it is nevertheless true that a boulder was broken open carelessly, and it was a surprise to the finders when they saw what it contained. A few minutes' digging there showed that it was the outcropping of a vein. Work has been pushed on this new discovery the past week, and when a reporter of the *Record* visited the spot on Thursday the vein had been stripped for 10 or 12 feet. The body of ore is about five feet wide and there is every indication of permanency, for the lime footwall and quartzite hanging are, as far as can be seen, regular and well-defined. Already the leasers have taken out about six tons of first-class carbonates that will assay about 100 ounces silver and 45 per cent lead to the ton, and shipments to the sampler will be commenced soon. Indeed some picked samples of the new find assayed as high as 600 ounces silver to the ton. There can be no doubt of the genuineness of the find, but the wonder is that it was not discovered before, because there is hardly a rod of ground up there that has not been slept on and walked over time and again.

WASHINGTON.

THE SALMON RIVER QUARTZ MINES.—*Oregonian*, Aug. 24: These mines are located on the eastern slope of the Cascade mountains, in a portion of the Moses reservation which was recently thrown open by the Government, and extends from the British boundary line to the Columbia river. Active developments in two shafts were being done on the War Eagle, owned by St. Paul capitalists, the same ore being found, and the two shafts will be connected with that of the Idaho mine for work and ventilation purposes for the mutual benefit of both companies. The joint tunnel will be 600 feet in length.

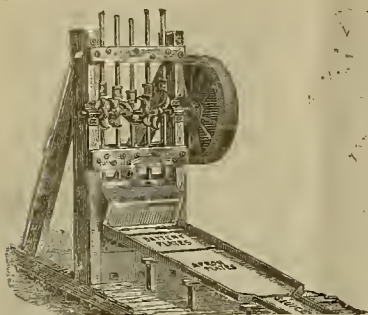
OTHER RICH MINES.—Perhaps the richest mines discovered thus far in this belt, known as the Ruby district, are the Fourth of July, First Thought and Lenora. Rich chlorides are present in the Lenora, although not in defined bodies. It is scattered through the ore, but if a body of the same character develops, it will prove very rich. This ore on the 15-foot level runs from 125 to 300 ounces of silver per ton.

THE FAMOUS ARLINGTON.—In the same mountain, 1 1/4 miles distant, a tunnel is being driven on the 200-foot level to tap the Arlington mine. There is a continuous chain of locations on the same lode from the Arlington on the south, a distance of over three miles, to the west fork of Salmon river. On the opposite mountain, and just above Ruby City, a cross-cut is being run to develop the Anaconda (a very rich mine on the surface) on the 150-foot level.

WANNICUT LAKE ORES.—The Wannicut lake ores are chie fly free-milling gold, a little silver being present. The veins are strong and well defined, often cropping throughout two or three claims. The most prominent properties are the Jessie, the Pinnacle and Rainbow, and the Black Bear and War Eagle. Every condition for mining and milling is admirable in this region, the winters being short and mild, and agricultural supplies abundant in the vicinity. Mule deer are very plentiful, as well as grouse and water fowl. A greater diversity of mineral lakes would be hard to find anywhere. The prevailing formations are granite, syenite, porphyry, lime and slate.

THE RICHEST SECTION.—North of the west fork of Salmon river is Mineral hill, in and about which are located the Conconelly mines. A great deal of development work has been done here, many of the properties having from 100 to 150 feet of work on ore. The veins are much smaller than in the Ruby district, but the ore is of higher grade. A 60-ton concentrator has been erected at Conconelly City, which lies immediately under Mineral hill. The most prominent properties of this vicinity are the La Una, the Lone Star, the Eureka, the Tough Nut and Homestake, the John Arthur, Lady of the Lake, Okanagan Chief and Sunrise. The first shipment of ore has just been made by T. L. Nixon from the La Una to San Francisco. The ore of this vicinity runs from 600 ounces of silver per ton, and it is confidently expected that the present shipment will yield 300 ounces per ton. An ounce of silver is worth 90 cents. There were 20 tons of ore in the shipment. The La Una product is a gray copper ore.

FACILITIES FOR REACHING THE MINES.—Last year from five to six days' staging was necessary to reach these mines from the rival outfitting points, Ellensburg and Spokane Falls. This season the time has been reduced on the Ellensburg route by steamboats on the upper Columbia to less than 30 hours. The present travel consists of 32 miles staging to Rock Island rapids, thence by steamer to Lumben's Landing, six miles above the mouth of the Okanagan; thence 30 miles by stage. The fare is \$16.50. On Rock creek, the Cariboo, owned by Spokane Falls and Portland people, is being developed with very satisfactory results, the ore sampling upward of \$80 in gold and silver per ton. Twelve miles from the properties last named, on Boundary creek, just north of the line, is located the None Such. This property is from two to three feet in width, and crops for over 1000 feet. It occurs between hills of porphyry and diorite. It is a milling and concentrating ore. Seven sample tests from this mine ranged from \$17 to \$575 per ton, making an average of \$160 per ton.



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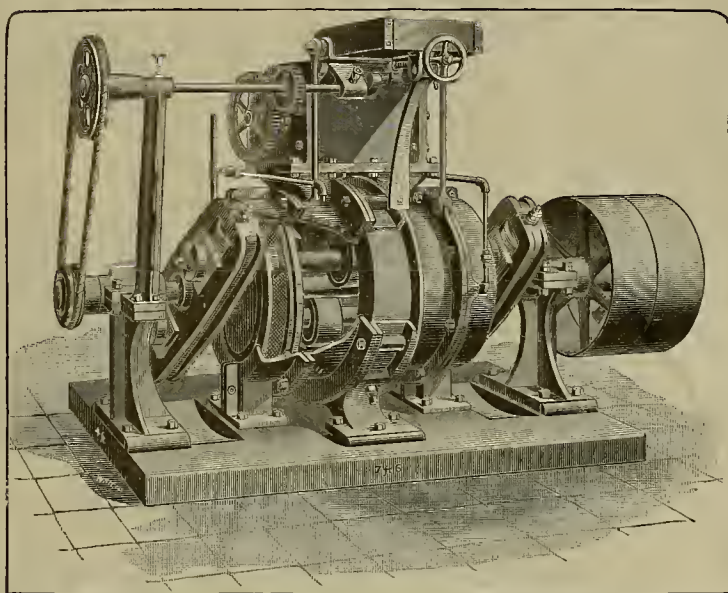
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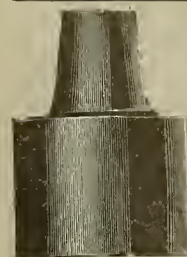
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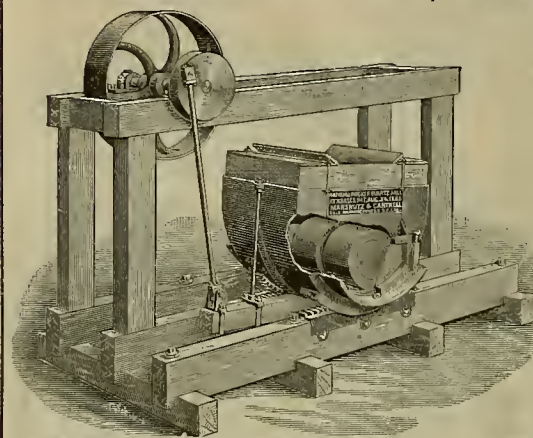
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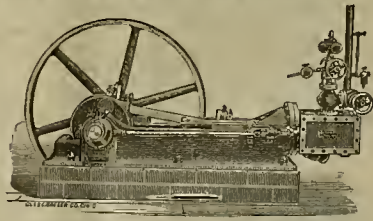
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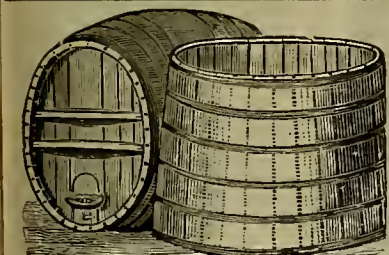
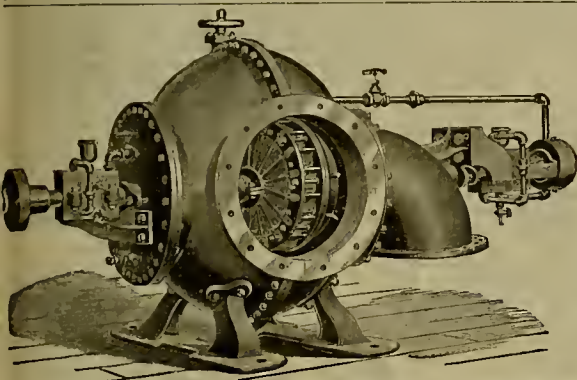
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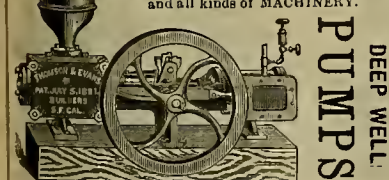
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Mining in Fresno County.

The indications are very promising that Fresno county will ere long take something like a prominent rank among the mining counties of the State. For several years some little mining has been done in the mountain regions of that county, and during the last two years several quite promising mines have been opened—both gold and silver.

The reported richness of the silver mines has recently attracted the attention of several successful expert miners of Montana. During the past week Messrs. Henry Klein and John Shopp and their mining superintendent, Mr. J. L. Waggoner, favored us with a call and assured us that from their intimate knowledge of silver mining in Montana, they entertained high hopes of the future of that portion of the country where they are operating upon their own property, under the name of the Star Mining Company, near the summit of Mount Raymond. They have already erected reduction works, and have just made arrangements to put up an elevated cable tramway, to carry their ore 7600 feet from the mine to their reduction and concentrating works, at a point lower down the mountain, where they have a fine water-power.

The vein is a very heavy one, carrying galena with a fair yield of gold and silver. They are now taking out about 200 tons per day, at a cost of about \$1.50 per ton, delivered at the mill, where it is concentrated for 50 cents per ton. The concentrated ore will be delivered at the railroad for \$10 per ton. It will be shipped to San Francisco or Denver for treatment.

There are quite a number of mines in the neighborhood awaiting the result of the work upon the Star mine. Small samples have been sent to this city for treatment, with very satisfactory results. Should the anticipated success be met with in the Star mine, it will no doubt be the means of introducing a large amount of mining capital into that portion of the country.

The Copper King mine, located about 28 miles east of Fresno City, has been taking out what is pronounced very rich ore for some time. Mr. J. F. Hutchinson, the lessee, is now about shipping a carload to this city. It is believed that this ore contains a workable percentage of gold and silver. Should it turn out as well as expected, it will at once be worked for all that it is worth.

There are already several San Francisco and English firms engaged in mining in this county, with mills of from five to ten stamps, and others are in contemplation.

Between gold, silver and copper in her mountains, and the rich agricultural products of her valley land, Fresno bids fair to become one of the richest and most productive counties in the State.

Mining Share Market.

Operations at the stock boards remain in statu quo—not better nor worse than they were one week ago. Variations in prices and volume of business have been few and of microscopic proportions. The minnows continue to swim around shyly, the more fortunate brokers getting now and again what the patient angler would call “a glorious nibble.” Nevertheless there is all the while a little being done, and some predict while all hope for an early improvement in the market. Meanwhile the bullion output continues steady and up to the full complement of late. There has occurred during the past month some falling off in the Comstock product; but this being due to lack of water for running the mills on the Carson river, will probably prove to be only temporary. While it lasts the deficiency is being nearly made good in other quarters, though many of the quartz-mills in California are suffering from the same cause.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports: Con. California and Virginia, Sept. 12, \$123,679; Daly, 4, \$9519.

THE Florence (A. T.) Enterprise says: The eviction of the settlers from the Maxwell grant of New Mexico and Colorado is being forthrightly resisted and bloodshed has already occurred. The sympathies of the people of the State and Territory are with the settlers.

A NEW YORK paper declares that a gang of expert thieves are systematically robbing the mails between that city and the West. All efforts to trace the loss of many thousands of dollars already taken have proved fruitless.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 4, 1888.

- 388,815.—CAR COUPLING—John Bound, Tucson, A. T.
- 388,051.—SAFETY COVER FOR POISON BOTTLES—F. O. Bratton, S. F.
- 388,954.—WATER REGULATOR—M. Cresalia, S. F.
- 388,806.—SHEET-METAL LATH MACHINE—E. Hawes, Sacramento, Cal.
- 388,870.—DOOR AND WINDOW SCREEN—E. Hepolito, Los Angeles, Cal.
- 388,977.—RAIL PUNCH—L. Huilne, Yaquina, Oregon.
- 388,978.—DEVICE FOR LIFTING GOODS FROM SHELVES—J. H. Jeffrey, Crescent City, Cal.
- 388,980.—STATION INDICATOR—John Knight, S. F.
- 388,986.—SIDEWALK CONSTRUCTION—J. McGillivray, Sacramento, Cal.
- 388,988.—HYDROCARBON BURNER—Samuel McMurray, Alameda, Cal.
- 388,993.—VENTILATING MANHOLES OF SEWERS—T. W. Morgan, Oakland, Cal.
- 389,007.—WINDMILL—J. S. Philpott, Windsor, Cal.
- 389,020.—NEUTRAL COMPOUND—A. Sommer, Berkeley, Cal.
- 389,021.—COMPOUND OF TALLOW AND CHLORIDE OF SULPHUR—A. Sommer, Berkeley, Cal.
- 388,932.—WINDOW—H. Tintrop, S. F.
- 389,122.—ACTUATING STATION INDICATORS—W. A. Turner, S. F.
- 18,583.—DESIGN FOR PINCUSHION—G. F. Atkinson, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DEVICE FOR LIFTING GOODS FROM SHELVES.—John H. Jeffrey, Crescent City, Cal., assignor of one-third to Henry Albert of same place. No. 388,978. Dated Sept. 4, 1888. This device, as its name implies, is to be used for the purpose of handing down goods from elevated shelves. It consists essentially of a long handle or pole, having connected, with its upper end, peculiarly arranged jaws for gripping the package of goods, and a table on which the package rests in handing it down, the jaws and the table being operated from below by means of a depending wire or rod, guided by the handle or pole.

WINDMILL.—James S. Philpott, Windsor, Cal. No. 389,007. Dated Sept. 4, 1888. The novelty in this invention consists in the simple but peculiar connection between the vane and the turntable, whereby when the former is forced around by the wind, in order to throw the wheel into the wind it not only turns on its pivotal center, but rises also, at the same time, on another pivotal center, and returns from this position by its own gravity. In this movement it keeps perfectly straight by means of a peculiar connection with the middle of the vane providing for its proper support and effecting its operation without undue strain.

SAFETY COVERS FOR POISON BOTTLES.—Ferd O. Bratton, S. F. No. 389,051. Dated Sept. 4, 1888. This is a very neat device for calling the attention of the person to the fact that the bottle contains some injurious material. It consists of a complete cap which is fitted over the cork of the bottle and embraces the neck. The cap is provided with a couple of spring arms which embrace the neck of the bottle, and are fastened in a small opening or slot in one edge of the cap. The cap is thus readily applicable to the bottle, and yet is so fastened that while capable of easy removal, the operation is such as to require the particular attention of the handler, thereby giving him full notice of what he is about.

HYDROCARBON BURNER.—Samuel McMurray of Alameda, assignor of one-half to Edward Donnelly, S. F. No. 388,988. Dated Sept. 4, 1888. This burner is of that class for using liquid hydrocarbons, in which the parts are so arranged as to provide for the union of the hydrocarbon with air and steam, whereby the former is atomized or vaporized. The invention consists in such an arrangement of the parts as will provide for the introduction and union with the hydrocarbon in a heated state of the air, also in the heated state, and superheated steam. The object of this construction of the burner is to provide for the most complete and perfect atomizing or vaporizing of the liquid hydrocarbon, which object is attained by the union of the hydrocarbon and air, both in the heated state, with superheated steam.

LAMP-SHADE HOLDERS.—Wm. E. Brown, assignor of one-half to Nathan Dohrman & Co., S. F. No. 386,686. Dated July 24, 1888. This holder consists of a central hub or ring, to which the arms which support the

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.	
Bullion M Co.	Nevada.	34.	50.	Aug 4.	Sept 7.	Sept 24. R. R. Grayson.	327 Pine St
Baker Divide M Co.	California.	16.	25.	Aug 13.	Sept 17.	Oct 8. D. M. Keut.	330 Pine St
Champion M Co.	California.	31.	12.	Aug 8.	Sept 10.	Sept 29. T. Wetzel.	322 Montgomery St
Crispin M & M Co.	Arizona.	10.	Sept 1.	Oct 15.	Nov 5.	G. B. Krut.	628 Montgomery St
Exchequer M Co.	Nevad.	20.	23.	Sept 8.	Oct 10.	Oct 31. E. C. Elliot.	360 Montgomery St
Golden Pledge M Co.	California.	13.	4.	July 31.	Sept 3.	Oct 1. W. J. Gleason.	386 Market St
Gray Eagle M Co.	California.	3.	10.	Sept 6.	Oct 1.	Oct 30. H. Hogart.	37 Pine St
Keyes S M Co.	Nevada.	2.	50.	July 16.	Aug 23.	Sept 23. M. F. Minor.	328 Montgomery St
Locomotive M Co.	Arizona.	3.	15.	Aug 21.	Sept 24.	Oct 15. A. H. Fish.	309 Montgomery St
Lady Washington Con M Co.	Nevada.	7.	25.	Aug 21.	Sept 28.	Oct 16. L. Osborn.	309 Montgomery St
Live Oak D H M Co.	California.	10.	05.	Aug 20.	Sept 27.	Oct 19. J. M. Hahn.	328 Montgomery St
Lord of Lorn G & S M Co.	Nevada.	5.	10.	Sept 6.	Oct 12.	Nov 2. R. N. Van Brunt.	15 F. Enchout St
Mayflower Travel Co.	Californi	42.	50.	July 31.	Sept 3.	S. pt 25. J. Morizio.	338 Montgomery St
Mexican M Co.	Nevada.	36.	25.	Aug 1.	Sept 13.	Oct 3. C. E. Elliot.	309 Montgomery St
Navajo Queen M Co.	Nevada.	1.	20.	Aug 3.	Sept 5.	Sept 24. J. F. Holling.	533 Kearny St
Ophir S M Co.	Nevada.	84.	50.	Sept 1.	Oct 4.	Oct 24. L. B. Holmes.	339 Montgomery St
Pondera M Co.	Nevada.	1.	05.	Aug 10.	Sept 11.	Oct 10. J. Stadler Jr.	309 Montgomery St
Scott Bar M Co.	California.	5.	10.	July 26.	Sept 3.	Sept 20. W. Richardson.	218 California St
Spring Valley G M Co.	California.	3.	10.	July 19.	Aug 25.	Sept 24. H. Ficher.	320 Sansome St
Savage M Co.	Nevada.	70.	50.	Aug 3.	Sept 5.	Sept 25. E. B. Holmes.	339 Montgomery St
Surra's Con M Co.	New Mexico.	3.	15.	Aug 15.	Sept 1.	Oct 15. I. C. Stamp.	339 Montgomery St
Terrakot G M & M Co.	California.	1.	02.	Sept 8.	Oct 8.	Nov 3. V. J. Gurnett.	308 Pine St
Virginia Creek Hyd M Co.	California.	6.	06.	Aug 29.	Oct 9.	Oct 29. J. M. Quay.	466 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE
Alaska M Co.	Nevada.	A. J. Jackson.	323 Sansome St.	Annual.	Sept 27
Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Sept 27
Grand Prize M Co.	Nevada.	R. R. Grayson.	327 Pine St.	Annual.	Sept 18
Gray Eagle M Co.	California.	H. Hogart.	327 Pine St.	Annual.	Sept 19
Mono G M Co.	California.	W. S. Adams.	330 Montgomery St.	Annual.	Sept 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	Sept 11
Confidene S M Co.	Nevada.	A. Grot.	327 Pine St.	1.00	Aug 6
Con. Cal. & Va. M Co.	Nevada.	H. B. P. Auten.	96 Pine St.	25	July 29
Mt Diablo M & M Co.	Nevada.	R. W. Heath.	313 Pine St.	25	Aug 27
North Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	50	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	July 11
Hale & McCross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50	Aug 3
Idaho M Co.	California.	A. H. Clough.	Grass Valley.	50	July 11
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	230 Montgomery St.	1.00	July 10
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	65	June 12

shades are connected; the hub or ring being so threaded at each end that it can be readily interposed between the lamp-bowl and the burner. It screws into the lamp-bowl collar, and the burner screws within it. The object of the invention is to make a holder which may be readily applied to any form of lamp, independent of the shape or construction of its burner, its chimney gallery, or other portion to which the ordinary shade-holder is usually attached. Lamps differ so much in the parts above mentioned that it is the custom to adapt a particular shade-holder to a particular form of lamp, and the shade-holder is generally inapplicable to any other form. But this holder, by screwing it into the lamp-bowl, and receiving in itself the lamp-burner, is adapted for any form of lamp, and can be used without interference with the removal or replacement of the burner. The arms, although they may be secured directly to the main ring or hub, are preferably secured to a ring which fits around the main ring or hub, so that the arms, under certain conditions, as when they have to be made of a peculiar shape, may be readily turned so as not to interfere with the insertion of the burner.

DEVICE FOR OPERATING STREET OR STATION INDICATORS.—Wm. A. Turner, S. F. No. 389,122. Dated Sept. 4, 1888. The object of this device is to prevent the actuation of the indicator by obstructions which may be accidentally present upon the track. In the appliances which have heretofore been used for operating these indicators, a single obstruction serves to operate the lever attached to the car, whenever the car passes the point where the tripping block is fixed; and through this lever the indicator card or device is exhibited. The objection to this is, principally, that it is liable to be actuated by obstacles accidentally placed on the track, in which case a false record is given. This invention overcomes this defect in the ordinary apparatus by the arrangement of levers in sets of two or more, and tripping blocks or obstructions correspondingly fixed in pairs or series in the proper intervals upon the roadway, so that the levers shall be actuated simultaneously, and if less than all the levers are moved then the indicator will not be affected thereby.

VENTILATING MAN-HOLES FOR SEWERS.—Thomas W. Morgan, Oakland, No. 388,993. Dated Sept. 4, 1888. This ventilator, which is adapted for man-holes for sewers, consists of a supplemental flue or chimney built in the wall of the vertical man-hole, and connected at or near its lower end with the man-hole. The top of the flue communicates through an opening in the side of the man-hole curve or cover, with the space just below said cover, a pan being arranged under the cover to close the main opening, thereby causing a draft or current of air from the sewer to go through the flue. The supplemental flue or passage is filled with charcoal or other disinfectant substance, and the gases arising from the sewer passing up the man-hole, will enter the flue through the lattice-work or grated opening below, and rising through the material of the flue, will again return into the man-hole above the pan through the top opening, and will thence escape into the open air. A free escape is thus provided for the gases, and if desired a means for purifying them, before they escape; while by means of the cover or pan within the curb, obstructing bodies are prevented from entering the man-hole.

SIDEWALK AND SIMILAR CONSTRUCTION.—John McGillivray, Sacramento, Cal., assignor of one-half to John R. Watson, same place. No. 388,980. Dated Sept. 4, 1888. This invention has to do with the construction of sidewalks, floors, ceilings, etc., and it consists essentially in a peculiar and novel girder for supporting the material of the sidewalk. It consists, also, in connection with the girder, of peculiarly ar-

ranged supporting planking or plating, which may be either temporary or permanent. The girder itself has, in cross-section, the shape, approximately, of an isosceles triangle, with the apex above. From the base of the girder project flanges on which the planking or plating rests, the sides of the girder being held together by cross-ties. The sloping sides of the girders act as wedges for supporting the material so that the usual supporting arches of brickwork may be dispensed with. This construction will permit of the ready removal and repair of any portion of the sidewalk or floor without having to remove the entire section. For a ceiling, the planking is bolted up under the girders instead of resting upon their base flanges.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 23.	WEEK ENDING Aug. 30.	WEEK ENDING Sept. 6.	WEEK ENDING Sept. 13.
Alpha.....	1.35	1.45	1.35	1.50
Alta.....	1.10	1.75	1.50	1.75
Andes.....	.75	1.05	.85	1.05
Argenta.....	.10	.10	.15	.10
Best & Belcher.....	2.95	3.65	2.00	3.40
Bullion.....	.45	.65	.65	.65
Baltimore.....	.55	.65	.70	.65
Belle Isle.....	1.25	1.45	1.30	1.45
Bodie Con.....	1.50	1.45	1.30	1.45
Benton.....	.20	.20	1.15	2.00
Bodie Tunnel.....	.60	.65	.70	.70
Bowling.....	7.00	8.75	8.75	9.00
Challenge.....	3.25	3.60	3.30	3.65
Champion.....	1.75	2.50	2.40	2.60
Chollar.....	1.10	1.75	1.50	1.75
Confidene.....	.30	.30	.30	.30
Con. Imperial.....	.30	.35	.35	.35
Caledonia.....	.30	.35	.35	.35
Con. Pacific.....	3.00	3.60	3.40	3.75
Crown Point.....	.70	.70	.70	.70
Exchequer.....	.30	.30	.30	.30
Central.....	.30	.30	.30	.30
Dudley.....	.30	.30	.30	.30
East B. & B.....	.30	.30	.30	.30
Eureka Con.....	.30	.30	.30	.30
Exchequer.....	.30	.30	.30	.30
Grand Prize.....	1.10	1.31	1.00	1.25
Gould & Curry.....	2.15	2.93	2.40	2.65
Hale & Norcross.....	4.30	4.83	4.30	4.45
Holmes & Co.....	.20	.20	.20	.20
Independence.....	.30	.30	.30	.30
Iowa.....	.30	.30	.30	.30
Julia.....	.30	.30	.30	.30
Justice.....	.75	1.20	.35	1.10
Kearney.....	.25	.25	.25	.25
Lady Wash.....	.25	.25	.25	.25
Martin White.....	.80	.90	1.00	1.15
Mono.....	.30	.30	.30	.30
Mexican.....	2.25	3.50	2.80	3.30
North Star.....	.30	.30	.30	.30
Northern Belle.....	.30	.30	.30	.30
Navajo.....	.30	.30	.30	.30
North Belle Isle.....	2.40	2.50	2.60	2.80
Niagara.....	.30	.30	.30	.30
Occidental.....	1.00	1.25	1.10	1.25
Ophir.....	4.35	6.50	5.25	6.00
Overman.....	1.15	1.40	1.30	1.35
Overman.....	2.00	2.63	2.35	2.60
Peelers.....	1.05	1.30	1.20	1.30
Pet.....	.40	.45	.40	.40
P. Sheridan.....	.40	.45	.40	.40
Silver Star.....	.30	.30	.30	.30
Savage.....	1.05	2.40	2.65	2.75
S. B. & M.....	2.05	3.00	2.55	2.70
Sierra Nevada.....	2.45	3.15	2.80	3.05
Silver Hill.....	.50	.55	.55	.55
Scorpion.....	.50	.60	.55	.60
Syndicate.....	.30	.30	.30	.30
Union Con.....	2.40	3.25	3.00	3.25
Valley.....	.30	1.25	1.10	1.20
Yellow Jacket.....	3.20	3.75	3.25	3.70

Sales at San Francisco Stock Exchange.

WEDNESDAY Sept. 12.		470 Hale & Nor.	4.20
100 Alfa.....	1.55	100 Keutuck.....	3.10
50 Andes.....	1.00	200 Mexican.....	3.35
100 Alpha.....	1.70	55 Mono.....	1.15
385 Belcher.....	5.00	350 N. Belle Is.....	2.75
250 B. & Belcher.....	4.30	100 Nev. Queen.....	3.15
420 Bullion.....	1.25	150 Overman.....	1.50
20 Bodie.....	1.50	425 Ophir.....	5.50
250 Baltimore.....	.60	100 Occidental Con.....	1.45
150 Benton.....	.25	50 Potomac.....	2.75
50 Chollar.....	.25	300 Peelers.....	1.65
250 Con Va & Cal.....	.80	410 Savage.....	2.90
30 Crown Point.....	.40	150 S. B. & M.....	3.15
50 Confidence.....	.11	350 Sierra Nevada.....	3.10
100 Exchange.....	1.35	200 Silver Queen.....	3.50
400 Crocker.....	.85	200 Scorpion.....	.60
100 Con. Imperial.....	.40	240 Utah.....	1.15
200 Exchequer.....	.30	20 Union.....	.70
370 Gould & Curry.....	2.20	300 W. Comstock.....	7.00
600 Grand Prize.....	.60	250 Yellow Jacket.....	3.95

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Sept. 13, 1888.

ANTIMONY—French Star.....	9 1/2	91
BORAX—Refined.....	7 1/2	—
Powdered.....	7 1/2	—
Concentrated.....	6 1/2	—
COPPER—		
Bolt.....	26 1/2	—
Sheeting.....	26 1/2	—
Ingot.....	16 3/4	—
Fire Box Sheet.....	—	26
Hogon—Hogonock 500.....	—	23 1/2
Kilgus, 500.....	—	27 1/2
American Soft, No. 1, 100.....	—	31 1/2
Oregon Pig, 100.....	21 1/2	32 1/2
Clay Lane White.....	—	23 1/2
Rhoda, No. 1.....	—	23 1/2
Bar Iron (base price) 10 lb.....	2 1/2	—
LEAD—		
10 lb.....	4 1/2	—
Sheet.....	5 1/2	—
Rivet.....	7 1/2	—
Shot, discount 10% on 500 bag Drop, 1/2 bag.....	1 1/2	—
Buck, 1/2 bag.....	1 1/2	—
Chilled, do.....	16 1/2	20
Billet—English, R.....	10 1/2	16
Black Diamond Tool.....	8 1/2	10
Pick and Hammer.....	4 1/2	5
Machinery.....	—	—
Tool Calk.....	5 1/2	6 1/2
TIN—		
Plate, 10 lb.....	6 1/2	7 1/2
Charcoal.....	38 1/2	40 1/2
QUICKSILVER—By the flask.....	1 1/2	—
Flasks, new.....	85 1/2	—
Flasks, old.....	85 1/2	—

New York Metal Market.

Telegraphic advices dated Sept. 13th give the following New York prices:

BAR SILVER—94 1/2c per oz.

BORAX—90.

COPPER—LAKES—\$17.50.

IRON—No. 1, \$22.00.

LEAD—\$5.00.

TIN—\$23.00.

The following is the latest by mail from the "New York Metal Exchange Market Report":

COPPER—Steady, spot closing at \$16.70/16.85. Transferable Notices (Lake) issued at \$16.50/—.

LEAD—Active, at \$4.92/—, spot. Transferable Notices issued at \$—/—.

TIN—Closed firm at \$21.50/22.00.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, —/—; Billiton Tin, —/—; Banca Tin, —/—; Baltimore Copper, \$14.75/15.00; Orford Copper, \$15.25/16.25; P. S. C. Copper, —/—; Foreign Lead, \$4.00/5.00; Foreign Spelter, \$5.40/5.50. Antimony, \$9.75/13.50.

Please Remit.

Too large a number of our subscribers are in arrears on this paper. Now that we have been a little overkind to such, there is the stronger reason that they should make an extra effort to remit the amount due us for subscription without further delay. We have been very earnest and sincere in presenting a paper to each and every one of our subscribers well worth the price asked for it when paid in advance, and in justice to ourselves we must now insist upon all subscribers in arrears paying up. While to each individual the amount is small, collectively it is large to us, and we are obliged to urge settlement.

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G. W. LEONARD—Arizona Territory.

A. F. JEWETT—Tulare Co.

C. E. WILLIAMS—Yuba and Sutter Co.'s.

JOHN L. DOYLE—Oregon, Montana and Idaho.

F. B. LOAN—Nevada State.

H. O. PARSONS—Oregon and Washington Territory.

M. C. BOW—Butte and Colusa Co.'s.

M. S. PRIME—Alameda Co.

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Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, California. Location of works, Gold Hill Mining District, State of Nevada. NOTICE is hereby given, that at a meeting of the Board of Directors of the above-named corporation, held on the sixth day of September, 1888, an assessment (No. 4) of Ten Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 12th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Friday, the second day of November, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. R. N. VAN BRUNT, Secretary. OFFICE 13 and 15 Fremont St., San Francisco, Cal.

ASSESSMENT NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer County, Cal. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 4th day of September, 1888, an Assessment (No. 9) of Five Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, 327 Pine street, rooms 9 and 10, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 10th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 30th day of October, 1888, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors. O. H. DODGE, Secretary. OFFICE—327 Pine St., Rooms 9 and 10, S. F. Stock Exchange Building, San Francisco, Cal.

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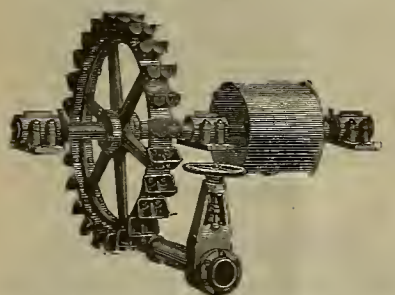
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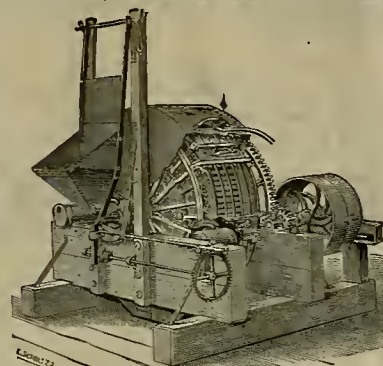
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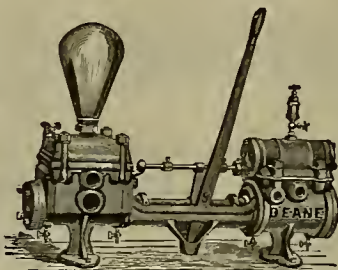
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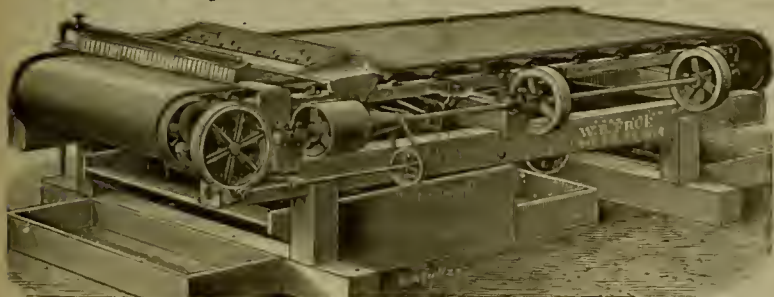
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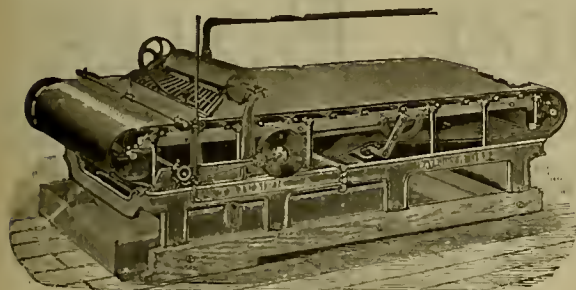
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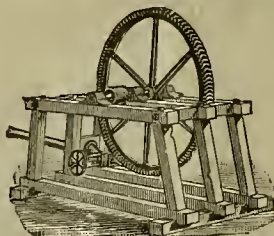
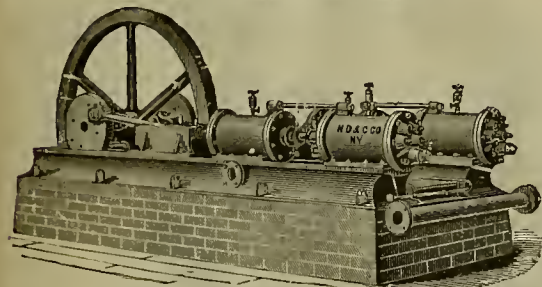
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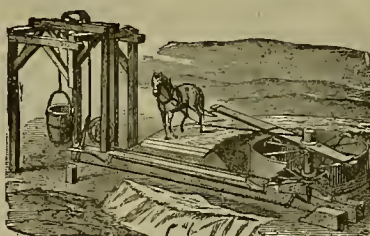
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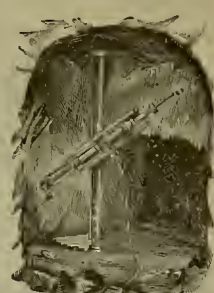


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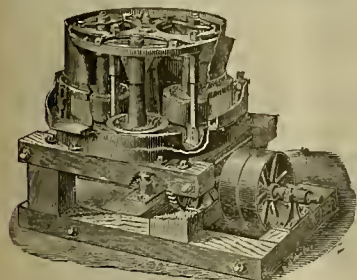
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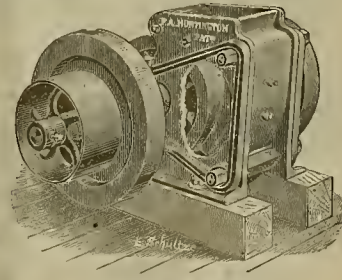
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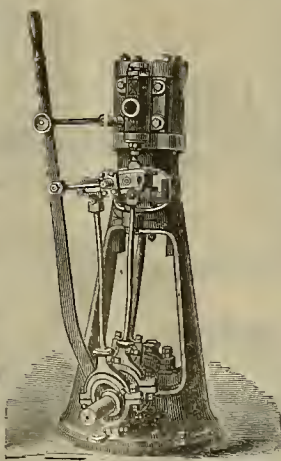
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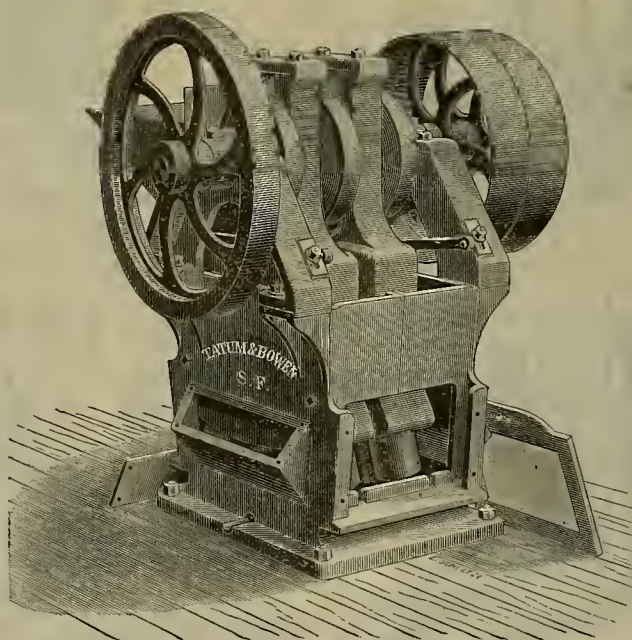
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Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

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Comparative Mythology.

An interesting lecture was given before the Academy of Sciences on Monday evening last by Adley H. Cummins on the subject of comparative mythology. Mr. Cummins said that many of the mythological tales had no ulterior aim but to entertain, simply appealing to the craving in humanity for fiction. They were tales which grew up around some half-developed savage custom. He proceeded to give an interesting account of the religion of the Aryans, their gods and surroundings; of the sun myths, Daphne and Apollo; Daphne, the first love of Phoebus; of Alphens, the river-god, and the nymph Arethusa; of Endymion and Selene,

Engine Lathes.

The engraving shown on this page represents the Lodge Davis & Co. engine lathe. They are made in six sizes to swing 17, 19, 21, 24, 27 and 38 inches, and of any length bed. The out given represents the 24-inch and 27-inch lathes, which, though massive in size, are as easily handled by their special conveniences as the smaller sizes.

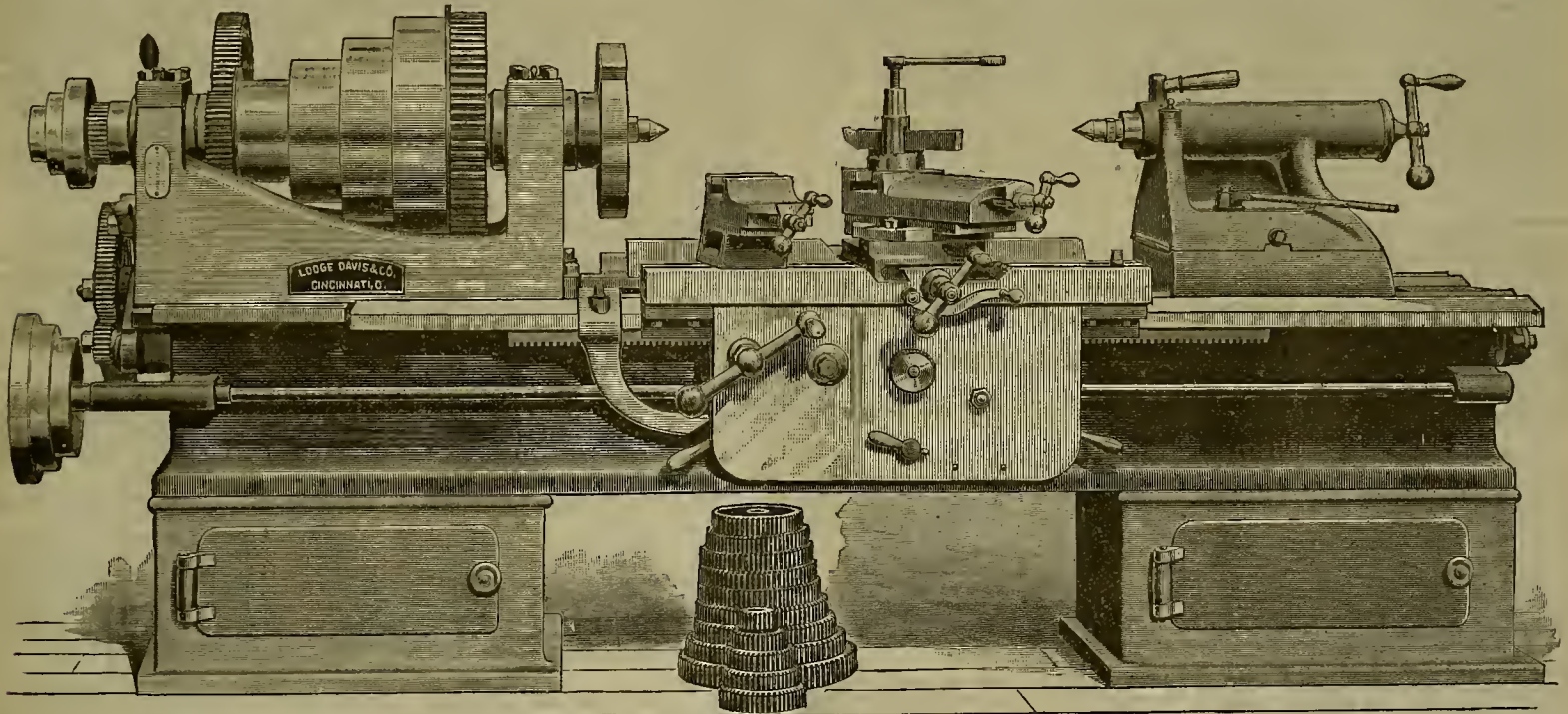
Nothing but the best material and workmanship is used in their construction. Spindles made from high-grade special steel and are hollow, and the boxes are made from the best phosphor bronze being provided for taking up wear and for easy and constant lubrication.

lets to suit each and every size wanted. With each lathe is sent the following attachments, which are usually furnished only as extras by other manufacturers: Compound rest, full-swing rest, taper attachment and automatic stop for carriage. These lathes are also provided with the usual steady and follower rests. The agents for their sale on this coast are Parke & Lacy, Nos. 21 and 23 Fremont street, this city.

MINERS' CABINS IN ALASKA, especially for winter occupation, have to be more substantially constructed than the same class of shelters are in the Sierras. The Juneau *Free Press* says that the miners there, however, find no difficulty in keeping their cabins warm and

Copper Ore in Heaps.

The roasting of ore in heaps or mounds is a slow but comparatively cheap process. The method varies slightly in different countries. In this country furnaces are mainly used for ores requiring roasting, but when heaps are roasted a single heap usually contains 30 to 40 tons of ore, and requires five or six weeks for the operation. In preparing it, a bed of cordwood about 16 feet square is laid as the base of the pyramid that is to be composed of ore. Directly upon the ground a course of thick billets of wood is laid, the sticks being parallel, a little distance apart to permit passage of a current of air. Above this, other courses of wood are laid



THE LODGE DAVIS & COMPANY ENGINE LATHE.

Orpheus and Eurydice; Varnna, Indra, Thor, Heimdol, Bragi, Oegir; Surya, the dweller in the globe of the sun; Aphrodite, who arose from the sea; Agni, Vulcan, Prometheus, Hermes and other gods of ancient lore of the heavens, the earth and the under world. Referring to the god Thor, who, in the tales of mythology, sat in the form of a raven on the shoulders of Hugin and Munin, the lecturer said he might be taken as a fit emblem of the newspaper of to-day. The god looks into the doings of men and of all things, and in many of the Vedic hymns we are borne entirely out of the realms of mythology, and man communicates directly with his Maker. By his ordinance the moon shines in the sky, and the stars which are visible by night disappear on the approach of daybreak. Neither the birds flying in the air nor the rivers in their sleepless flow can attain a knowledge of his power or wrath. His spies behold both worlds. He himself has a thousand eyes. He knows the flight of birds in the sky, the path of ships on the sea, the course of the far-sweeping wind, and perceives all the hidden things that have been or shall be done.

The live heads are wedged their entire length and not weakened by cutting to make room for reverse plate, as no reverse plate is used. All feeders are reversed in the apron. Tail stocks have set over and are particularly solid and substantial, with heavy spindles and centers and nuts and clamping bolts of steel.

The lead screws are steel, extra large, placed directly under the front, V, on which the tail-stock slides, are inside of bed and covered, taking hold of the carriage in the center of its weight, and directly under the line of strain when cutting screws.

The dog shown on the bed may be set and clamped at any point, and will then form an automatic stop for the carriage. This is quite a feature where large quantities of work of one kind are being done, besides making it very handy to drop rack pinions out if desired when cutting screws. No worms or worm gears are used, consequently all feeds will reverse instantly without losing a fraction of a revolution.

The following rest is provided with means of adjustment so that any size shaft within range may be handled without stopping to make col-

comfortable, as they make use of Russian ovens, which are very simple to build, as they are made of stone, in the shape of a large box-stove, from three to four feet long inside, from 18 to 20 inches wide, and the same in depth, with an iron plate on top to cook on. The chimney is built of the same material. Miners who wintered here last winter and the previous winter went out every day to out their regular firewood, and so far no severe cases of frozen limbs have occurred. Indians travel and live in brush-houses all winter. They subsist chiefly on dried moose, caribou meat and fish.

A RAILROAD TO THE LIVERMORE COAL MINES. A survey for a railroad from Livermore to the coal mines, a distance of about eight miles, is now being made by the Livermore Coal Mining Co., and work will be begun within 90 days. The company is now working day and night with three shifts of men on their incline, and have a four-foot vein of good clean coal.

The wild gooseberries which grow plentifully in the neighborhood of Truckee are pronounced better than the tame fruit.

more closely and crosswise, forming a bed five or six inches thick, requiring altogether about a cord of wood for a single heap. A wooden chimney or box-flue 9 or 10 inches square is set up vertically in the center, passing down through the bed of fuel and reaching above the top of the heap. A small quantity of charcoal is put in at the bottom of the box or chimney, and the heap is ignited when ready by setting fire to the coal.

The ore is formed into a heap about four or five feet high on this foundation and around the central chimney. The larger pieces are placed on the inside and the whole covered on the outside by a layer of fine stuff. This is so disposed as to control the rate of combustion, promoting it if too slow in any part by opening a passage for the draught, or checking it if too rapid by covering more closely. The heaps when burning require only sufficient attention to insure a proper rate. If allowed to burn too rapidly, the ore slags; or, if too slowly, the calcination is imperfect and the fire may go out altogether, requiring rehandling, with a loss of time and money. Tailings, owing to their fine condition, cannot well be roasted in heaps.

The Russell Process.

Its Practical Application and Economic Result.

(Continued from our last.)

G.—Mechanical Treatment of the Products.

The precipitated sulphides are removed from the three precipitating-tanks for solution about once in three days, and the precipitate from the wash-water tanks at the same time if the wash-water has been precipitated by sodium sulphide, otherwise, usually only once a week. To remove the sulphides, the clear solution is decanted by means of the surface discharge as low as possible. The gate or valve on the rear of the precipitating-tanks is then opened, and the sulphides allowed to run out into the trough or launder leading to the tank for the storage of sulphides. The sulphides are permitted to settle in this tank, and the clear solution again decanted, so as to save running it through the press. The storage-tank, of the size given in the drawing, will hold the sulphides for one week's run, or about 700 tons of average ore. The sulphides may be more compact and reduced in bulk about two-thirds by using a jet of steam in the storage-tank. But, if this is done, the sulphides should be allowed to cool before pressing, for reasons explained further on. When the sulphides are to be pressed, all the valves between the storage-tank for sulphides and the filter-press (except the steam valves on top of the pressure-tank) are opened, so that the sulphides run freely through the pressure-tank into the press. In this way, two-thirds of the pressing is accomplished by gravity. While the sulphides are running into the press, the contents of the tank are occasionally stirred. When the press is so full that the solution comes only slowly from it, the valve between the sulphide storage-tank and the iron pressure-tank is closed, and as soon as the liquid in the pressure-tank has sunk below the level of the small valve on the side of the pressure-tank, three or four inches below the top, steam at full pressure is turned into the pressure-tank, until again the clear solution comes only slowly from the filter-press. It is best not to have the pressure-tank quite full when the steam is turned into it, as the solution would be heated by it, and a hot solution has a bad effect on the filter-cloths, so that they do not last more than one-half as long as they otherwise would. When the press is full, which is indicated by the pressure-gauge, as well as by the slow running of the clear solution from the press, the steam is turned off and allowed to escape from the pressure-tank, and the valve between the pressure-tank and the press is closed. The trough under the press, for conducting off the clear solution, is then removed, and a large iron pan about three feet wide, five inches deep and long enough to reach the whole length of the press between the legs, and having handles, is placed underneath the press. The press is then emptied by eliding the plates apart, and inserting a wooden (not a metal) paddle behind the cakes which causes them to drop into the pan. If distance-rings are used, they are removed from press by the handles and the cakes pushed out. When the press is first opened, a small amount of solution may run out, so that it is best to have the press set in a low tank, about two inches deep, and with a drain-pipe in one corner leading down to the sump under the press.

An 18-inch press has a capacity without distance-rings corresponding to about 250 pounds of dry sulphides per hour. The distance-rings are used when a greater capacity is desired, but the cakes will then contain a greater percentage of moisture.

The appearance of sulphides pressed at 150 pounds per inch does not indicate the presence of more than 10 per cent moisture, but they have in reality about 38 to 42 per cent. If these sulphides are dried in a reverberatory furnace, 0.5 per cent is likely to be lost in dust, and considerable labor is involved.

The best method of drying is by steam, in which there is no loss, and which requires only a nominal amount of labor. After being dried, which occupies two or three days, the sulphides are sampled on the iron floor beside the steam drier. The lead carbonate precipitate is pressed and dried in the same manner as the sulphides.

H.—General Remarks.

While the first wash-water is draining from the leaching-tank, preparatory to using the leaching solutions, cracks are likely to be formed, due to a slight settling of the ore. Before the leaching solutions are used these cracks should be filled up by smoothing over the surface of the charge with a wooden hoe. Also before and during the use of the extra solution, particular care should be used in filling up any cracks, especially around the sides of the charge; otherwise the effect of the extra solution may be decreased.

For maintaining a partial vacuum under the filter and thus accelerating the leaching and circulating the extra solution, the Aller lead-lined siphon pump is the best. It is applicable in all cases except on such extremely fine material as that at Silver City, another case of which is not likely to be found. The various sizes used are Nos. 2, 3 and 4 for leaching-tanks of 12, 14 and 16 feet diameter, respectively. If the leaching-rate without a vacuum is 6 to 8 inches an hour, the use of a siphon pump will usually double it. If only one-quarter to one-half an inch per hour, the use of a siphon

pump will often raise it to 6 or 8 inches. If a more positive vacuum is necessary, as was the case at Silver City, a No. 4 or 5 Knowles pump is used, one being sufficient for a mill of 50 tons capacity.

The lowest six inches of the charge of ore will sometimes show a less thorough extraction of the silver than the uppermost six inches, or the average of the whole charge. Therefore, than in starting new works, or if the value of the tailings is not satisfactory, the lowest six inches of the tailings should be sampled, and this should also be done whenever two methods of leaching are to be compared. If the tailings are sluiced out, the amount of water required for sluicing is 12 to 18 feet per ton of ore. But if roasted ore is being treated no additional water is required, as the last half of the first wash-water can be used for this purpose, being conducted down to and stored in a suitable tank near the fire pump.

III. Leaching Plant.

A.—General Remarks.—In Mr. Stetefeldt's paper on the Russell process in its practical application (Transactions American Institute Mining Engineers, Vol. XV) a short description was given of the plant required for the Russell process. This, however, in view of the many improvements made in the year and a half since the date of that paper, is not sufficient, especially as no plans and only one detailed drawing were given. The working drawings here given comprise the best features of five leaching plants, built especially for the process, and of the Sombrette plant now being constructed. With the exception of two minor details on the precipitating-tanks there is nothing given but what has stood the test of actual practical experience. The plant is entirely independent and complete as it stands and may be situated wherever convenient, without reference to the position of the crushing plant for raw ores, or for the crushing chloridizing plant for roasted ores, except as regards the easy transportation of the raw or roasted ores between the two plants.

Consequently when either one of the two above-mentioned plants for the preparation of the ore already exists in connection with amalgamation, the change to the Russell process can be made by the erection of the plant herein described without stopping or removing the amalgamation plant. The plant has its own boiler, and no engine is required.

TABLE XXIII.
CAPACITY OF THE PLANT PER DAY FOR VARIOUS ORES
AND TAILINGS TREATED BY THE RUSSELL PROCESS.

Name of ore.	Kind of material.	Weight of 1 cubic foot pounds.	Depth of charge in extra solution is made up in separate tank.	Corresponding weight of charge in tons.	Total capacity of plant per day if tailings are sluiced out.	Total capacity of plant per day if tailings are shoveled out.
Silver Ref.	Raw ore and tailings.	80.	55.	110	100	120
Pioche.....		100.	68.	155	135	155
Parral.....		80.	55.	110	100	120
Lake Valley.....		85.	59.	170	140	170
Parral.....		85.	60.	145	120	145
Yedras.....		41.	41.	89	70	89
Ontario.....		65.	44.	130	110	130
Daly.....		65.	44.	130	110	130
Sombrette.....		60.	41.	120	100	120
Cust.....		70.	48.	110	100	110
Chloride.....		70.	54.	140	120	140

12 hours allowed for filling each tank.
2 hours allowed for emptying each tank if the tailings are "sluiced out."
12 hours allowed for emptying each tank if the tailings are "shoveled out."

Table XXIII gives the capacity of the plant for various raw and roasted ores and tailings in tons per day. This capacity may be further increased to the extent of 30 per cent by the addition of two more leaching-tanks, without making any change in the rest of the plant. On the other hand, it is not advisable to erect less than six leaching-tanks, since the remainder of the plant should be the same even if only four leaching-tanks were used. In the drawings showing the elevation of the plant, imaginary grade-lines are shown, one being about 25° and the other about 30°. These grades would be the most suitable, but they are by no means necessary. At Sombrette the same kind of plant is being constructed on a grade of only 12° to 15°.

The building containing the pressure-tank, filter-press, and steam-drier can be put in front of the sump for the solution pump and the storage-tank for sulphides, instead of at the side.

In the plan, the floor is supposed to be removed, but are shown in the elevation. Pipes, details and dimensions are omitted in some of the views, in order to avoid a complicated drawing, but are given in the others. Figures alongside of pipe-lines indicate the sizes of the pipes. All tanks of all kinds, and all troughs or launders are accessible on every side.

B.—Leaching and Storage Tanks and the Tank for the Preparation of the Extra Solution.

All the wooden tanks are usually of white cedar, but this material is not necessary, as was shown at Silver City, the tank lumber being obtained only a few miles from the mill, and put in position while comparatively green. Such a course is not, however, to be recom-

mended. The best plan, except for shipment to Mexico, is to order the tanks made in San Francisco, in diameter about two inches larger than as finally erected, ready to put up, with the exception of having no dowel-pins in the bottom and no gain in the staves. The sides of all the tanks are straight. In making the tanks, even if they have been set up in San Francisco, the staves are dressed to sweep of tank, and of such a length as to allow a 6-inch ohime.

The gaining of the staves, one inch deep, is done by hand. No dowel-pins are used in the bottom, but instead the sides are grooved and joined with a tightly-fitting tongue $\frac{1}{2}$ by $1\frac{1}{2}$ inch, which is imbedded in the grooves with white lead.

All joints of the staves and bottoms, and particularly where the bottom enters the gain in the staves, must be fitted with the greatest accuracy, and the surface forming each joint must be covered with white lead just before finally putting them together. Nails or screws must not be used anywhere. Finally, the tanks are covered outside with three coats of white-lead paint, the last being one of a dark color, such as will not show dirt.

If the lumber is perfectly dry, several coats of paint inside will be beneficial. Too much care cannot be used in the putting together of the leaching-tanks, since not only is an absolutely tight tank required, if the ejectors are to be used to accelerate the leaching, but also because the use of the ejectors will greatly augment any defect in the tank. In the construction of storage and precipitating tanks for solution, so much care is not necessary, but will be found advantageous. But the construction of the precipitating-tanks for wash-water requires more care than for any other except the leaching-tank, as the wash-water requires to be heated if the precipitation is by acid and iron. These tanks should be of dry lumber, carefully put together and coated with paint. The dimensions and number of all tanks are given in the drawings, the storage-tanks being of the same dimensions as the precipitating-tanks.

The space under the filter in the leaching-tanks should be as small as possible. The false bottoms for these tanks are prepared as follows: Wooden slats $1\frac{1}{2}$ inches high and 1 inch wide and separated one inch from each other, are fastened to the inside of the bottom of the leaching-tanks by screws imbedded in thick white lead. The side of the slats next to the bottom is cut out, about every 7 or 8 inches, $\frac{1}{2}$ inch deep and 3 inches wide, so that a passage for the solution is established everywhere. Between the end of the slats and the staves a clear space $1\frac{1}{2}$ inches wide is left all round, a strip of wood $1\frac{1}{2}$ inches high and 1 inch wide, previously cut by a saw on one side in many places and well soaked in water so that it will bend easily, is fastened around the slats, leaving an annular space five eighths inch wide between the strip and the staves. One thickness of stiff matting (covering the slats and the circular strip, but not the annular space) forms a foundation for the filter cloth proper.

The latter, No. 8 canvas duck, is cut to a diameter 6 inches greater than the inside of the tank so that the edges can be pressed into the annular space described above, and kept in position by forcing down a one-half-inch rope. The filter does not require to be removed oftener than once in six or eight months.

There is only one outlet to the leaching-tanks, which is in the center. It consists of a threaded cast-iron flange, bolted to the bottom, the bolts passing through the bottom, and together with the heads being imbedded in white lead. The details of these flanges, and the manner of connecting the two hose with them, are given in Figs. 12, 13, and 16 of the details.

There are three storage-tanks, the use of which vary according to circumstance, as follows:

First.—If raw ore is being treated, one of them (H) is always used for the preparation of the extra solution, and the other two (G, G) for heating and storing warm solution, which is always used in treating raw ores. Second.—If roasted ore is being treated and there is ample leaching-tank capacity, the extra is made up on the ore, the storage tank (H) being used for heating and storing warm stock solutions, and the other two (G, G) for cold stock solution, the coils in the bottom of the latter two not being used. Third.—But if the leaching-tanks are to be run to their utmost capacity, the storage-tank (H) is used for the preparation of the extra solution and one of the other two for warm stock solution and one for cold. The bottoms of the storage-tanks are six feet above the tops of the leaching-tanks. The method of heating the solution is by means of a coil consisting of about 100 feet of $1\frac{1}{2}$ -inch lead pipe in each tank, supported on wooden blocks about 4 or 5 inches above the bottom. In regard to the triple connection between the three storage-tanks, in the first and second cases described above, the valves on the two tanks (G, G) are left open all the time, and the valve on (H) shut all the time.

In the third case all the valves are kept closed.

Above the storage-tanks and just under the ends of the pipe which brings the solution up to the storage-tanks from the solution-pump, are boxes about 2½ feet square and one foot high inside, with one-inch holes in the bottom. The boxes over the two tanks (G, G) are for the purpose of breaking the force of the stream of solution as it comes from the pump, which would otherwise disturb the small sediment of sulphides which is still mechanically held in the solution and is gradually deposited on the bot-

tom of the storage-tanks and is removed once every few months.

This sediment, if disturbed, would pass out of the storage-tanks on to the surface of the ore in the leaching-tanks, and any portion of it deposited after the use of the extra solution might be thrown out with the tailings. But this box has for tank (H) an additional use if the extra solution is made up in that tank, as it serves as a chemical-box in which the chemicals for the extra solution are dissolved by the solution passing through it.

At the bottom of each storage-tank around the outlets are small boxes about six inches high, with perforated tops, which act, not only to prevent the solution being drawn down below six inches, thus keeping back sediment, but also keep chips, etc., from getting into the pipes and valves, over the leaching-tanks. But if the storage-tank (H) is used for the preparation of the extra solution, this box must be removed so as not to keep back any cuprous hypsulphite, or yellow precipitate, which may be on the bottom of the tank.

The hoops of all tanks are of round iron, flattened at one end and with a lug forged on the outer side. The other end of the hoop is upset, threaded, passed through a hole drilled in the lug and a nut screwed on the end. The method of passing the hoop by the sluice-gate is shown in detail in Fig. 12.

C.—Precipitating and "Sump" Tanks and Storage-Tank for Sulphides.

The tops of the precipitation-tanks should be about four feet below the inside of the bottom of the leaching-tanks. The number of the precipitating-tanks required will vary according to the following circumstances:

In the treatment of raw ores there is no first wash-water to be precipitated, so that the total number of precipitating-tanks for a raw-ore plant is only three instead of the six shown in the drawings.

In the treatment of roasted ore from which the solution dissolves little or no lead, the number of precipitating-tanks is the same as shown in the drawing.

If lead is to be precipitated, three additional tanks will be required, and should be placed between the tanks for the precipitation of solution and those for the precipitation of wash-water. They may be placed in the same line and on the same level, and the solution forced from them into the tanks for the precipitation of silver and copper, by means of siphon pumps. The details of the surface discharge (d') of the precipitating-tanks are given in detail, Figs. 6 and 7. As to the stirring apparatus, a mechanical stirrer is entirely unnecessary and in the way.

With an ash or of 16 feet length, the total amount of stirring in 12 hours amounts altogether to only one hour by one man. For easy stirring with the ear, the platform around the precipitating-tanks should not be more than six inches below the top of the precipitating-tanks. The "sump" tank (D) for the solution pump has a box and strainer around the outlet, for the same purpose as that described under the head of storage-tanks. The storage-tank (E) for sulphides has no such box. The pipes from the precipitating-tanks should be coated on the outside with asphaltum varnish; particularly is this necessary for the discharge pipes from the wash-water precipitating-tanks.

D.—Tanks for the Preparation and Storage of Sodium Sulphide and Soda-Ash.

The tank, J, for the preparation of sodium sulphide, is of cast iron, in two sections, the lower being $1\frac{1}{2}$ inches thick and the upper three-fourths inch. The two sections are bolted together through flanges and the joints are leaded. On to the bottom is poured 1 to $1\frac{1}{2}$ inches of melted lead. The pipe for live steam reaches to within $1\frac{1}{2}$ inches of this lead plate.

The two tanks, K, J, for the storage of sodium sulphide, are of three-eighths inch boiler iron, and in the drawing are represented with flanges on top, which are not necessary.

It will be noticed that there is a partition forming a small room around the tank for the preparation of sodium sulphide. This is necessary because in breaking up a drum of caustic soda, pieces are likely to fly and get into the storage-tanks holding the leaching solution.

If soda-ash is to be used as a precipitant for lead, the same number and size of tanks should be used as for sodium sulphide, and arranged in the same way, but are all of three-eighths-inch boiler iron.

E.—Pipes, Valves, Launder (or Troughs), Sluice Gates and Chemical-Boxes.

The sizes of all pipes are given in the drawings. The only place where the solution has any material effect on iron pipes is between the outlet of the leaching-tanks and the precipitating-tanks. Therefore rubber hose is used, which seldom requires renewing. Six-ply steam hose is recommended, simply because it is more durable and does not kink or sag, or wear out at the ends if continually plugged. The line α , leading from the center of the leaching-tank to the triple launder, is in one piece. Wooden plugs are used for stopping the end. The hose β , leading from the center of the leaching-tank to the siphon, is the same size as the other, is attached to the flange below the other hose, and must have a gradual slope, without a sag, down to the siphon pump, so that any drop of liquid coming from the leaching-tank will run down into the siphon pump.

The hose leading from the siphon pump up over the leaching-tank is also of the same size and in one piece, and is used in circulating the

extra solution. The end must be movable from one compartment of the double launder to the other. There is also a short piece of hose (e) leading from the siphon pump to the triple launder, necessary only when the siphon pump is used to accelerate the leaching. At other times it is kept plugged.

The ends of both pieces of steam hose lying over the triple launder can be moved from one compartment to another.

The valve in the steam pipe which furnishes steam to the siphon pump should be of Jenkins' pattern, and situated three or four feet above the siphon so that the leaching solution cannot come in contact with it. As described below, the steam for this siphon pump must be dry and therefore the main and branch lines of steam pipe must be covered. The 2½-inch pipes (a' and b') from the launders to the precipitating tanks are also steam hose.

In order to keep any sand or sediment which might get into the launders from passing into the precipitating tanks, nipples or short pieces of 2½-inch pipe are inserted in the outlets of the triple launder and project about one inch above the bottom. The launder (l) and the pipe (z) are for that part of the wash-water which does not require to be precipitated. The trough (or launder) (m), at the back of the precipitating tanks, conducts the sulphides to the storage-tank for sulphides. It has a grade of about 4 feet in 100. The sulphides are run into it from the precipitating tanks by a short pipe attached to a flange bolted on to the precipitating tank just above the bottom, so that all the sulphides can run out.

The valve is a gate valve, something like a molasses or oil gate, and is shown in detail in Figs. 8 to 11 inclusive.

The launder (n, o) in front of the precipitating tanks is horizontal, and has a division opposite a point between the third and fourth precipitating tanks, so that one-half its length is used for conducting solution to the pump sump, and the other half to conduct the precipitated wash-water out of the mill.

One side of the double launder above the leaching tanks has no division, but runs the whole length of the leaching tanks, having a hole over each, which is closed with a wooden plug. This serves for transferring the special extra from one ore charge or tank to another. The other compartment of the launder has a division between each two leaching tanks and conducts solution or water to the chemical box, which has a perforated bottom and serves not only as a receptacle for chemicals, but also to break the force of the stream of solution, so that it does not make a hole in the ore.

The sluice-box or launder conducting the tailings out of the mill should have a slope of one inch to the foot.

The opening should be about 12 inches high by 18 inches long. The hose connections for sluicing are shown at y. The two lines of hose are each 30 feet long, each doing duty for three leaching tanks.

The sluice gate shown in detail in Figs. 12 and 13 is packed with a rubber gasket. The solution pump sets in a low tank about six inches high, which catches any solution that may leak from it, and a pipe conducts it to the sump-tank under the filter press.

The water pipe r is for leaching. There is no occasion for any water pipe to the storage tanks, as no water is there required after once making up the stock solution. On that occasion the water may be obtained by running water into one of the leaching tanks and then down to the solution pump and pumping it up to the storage tanks.

All the valves in the triple connection between the storage tanks are gate valves; also those on the pipe line leading up from the solution pump to the storage tanks and those near the storage tanks on the pipe lines leading from the storage tanks to the leaching tanks, and all those on the sodium-sulphide tanks and pipes; but all those over the leaching tanks are Jenkins' rubber-faced globe valves. The valves between the solution pump and "sump" and between the storage-tank for sulphides and the pressure-tank, and between the pressure-tank and filter press, and on the pipes which convey the sediment from the solution-pump sump and the solution storage tanks, and on the line of water pipe for sluicing tailings, are also gate valves. At every angle in the pipes for conveying sodium-sulphide should be a cross instead of an elbow. A slight sediment of silver sulphide gradually collects in the solution-pump sump and in the solution storage tanks which must be occasionally removed. This is done by means of the pipes a, b' and c'. The valves should be near the tanks. The pipe from the solution-pump sump ends near the bottom of the pressure-tank, and is connected with it by a hose-coupling only when needed; a permanent connection not being advisable, as a leak in the valve might occur without being detected, thus allowing sulphides to be forced back into the solution-pump sump.

(To be Continued.)

The Salt-Beds of South America.

The salt-beds on the west coast of South America, according to the description of Dr. Carl Ochsénius, occur in a narrow strip along the coast line of the rainless district, rarely exceeding 25 miles in width. The district is bounded on the east by the Andes, and extends into the coast Cordilleras on the south. The author considers that, before the upheaval of the Andes, salt began to deposit in certain bays,

which had been wholly or partially shut off from the sea by the gradual formation of an intercepting bar. Then, while the process of evaporation was still incomplete, the district was raised by volcanic action, and the mother-liquors from the salt lakes eventually escaped, running down into the valleys, and, where they encountered no obstacle, reaching the sea. The coast Cordilleras acted as a barrier in the southern portion of the district, while in the northern part the liquors doubtless returned to the sea. The volcanoes which produced the upheaval exhaled immense quantities of carbonic acid gas, by the action of which a portion of the sodium chloride in the mother-liquors was converted into sodium carbonate. The coast in this part of Chili is studded with small islands containing deposits of guano rich in ammonia. The guano dust is carried by the prevailing west winds far into the country, where, on exposure to the air, at a warm temperature, it would gradually oxidize to nitrate, and, acting on the sodium carbonate, would form sodium nitrate, or Chili saltpeter.—*Popular Science Monthly.*

Natural Gas and the Brine Wells of China.

Consul Denby of Peking explains that to make a well (natural gas is found in several Chinese provinces) the Chinese use a long and elastic bamboo pole, supported in the middle by a crosspiece, a rope made by coupling the ends of long pieces of bamboo, and an iron instrument which weighs about 100 catties—the catty being equivalent to one pound and a third avoirdupois. The rope is fastened on the thin end of the pole, and the iron on the end of the rope. A slight up-and-down motion of the thick end of the pole makes the iron move a vertical hole with its broad, sharpened edge. The ground to be bored consists chiefly of sandstone and clay. When a portion of the rock is crushed, clear water is poured into the hole, a long bamboo tube with a hole in the bottom is lowered, and the turbid water raised to the top. Pipes of cypress wood are rammed in to protect the sides of the bored hole, and to prevent the water contained in the surrounding ground from gaining access to the well. The pipes are attached to each other at the ends with nails, hemp and tung oil. The inner width of the pipe is about five inches. As the work proceeds the pipes are rammed down and a new one attached on the top; the rope, too, is made longer. At a depth varying from 70 to 100 chang (from 700 to a thousand feet) the brine is struck and the well is fit for use. The brine is raised to the top through long bamboo tubes and bamboo ropes, and then carried to large pans for evaporation or led to them through bamboo pipes.

Besides these wells, there are others which are bored to a depth of from 1800 to 2000 feet. At that distance below the surface petroleum is struck. Immediately on reaching it an inflammatory gas escapes with great violence; work is now stopped and a wooden cap fastened over the mouth of the pit, perforated by several rows of holes. In each of these a bamboo pipe is inserted, and through these the gas is led into the evaporation pans. The pipes ramify, and on each end a tapering mouthpiece, terminating in a small aperture, is attached; the gas is then used for evaporating the brine.

A Miner Who Made \$12,000,000.

Marysville, nearly 30 miles from Helena, is a second Wickes in appearance, but when one remembers the wealth of the mines which have created the town, he forgets the ugliness of the streets and ceases to notice the dilapidation of the rudely built cabins. Marysville is chiefly famous as the site of the Drumlunnon, but does not depend on this mine alone for its support. The town is in the chief seat of an extremely rich district, already well developed, and is an important suburb of Helena. It is connected by rail with the latter city, and will eventually be the terminus of a branch of the Manitoba road.

The discoverer of the Drumlunnon was Thomas Cruse. In the days before he sold his property and returned to Helena a much-honored millionaire, Mr. Cruse was locally known as "Old Tommy," and was looked upon as a somewhat visionary man. None questioned, after a time, that his mine, where he lived and labored alone, was valuable, but few placed its worth so high as did the patient owner.

When he refused half a million for his mine, the people of Helena called him foolish, and when he turned away from the offer of a million, they called him a fool. But the miner was wiser than his friends, and eventually received its price, \$11,500,000, and a goodly number of shares in the new company. Then, as so often is the case, the old familiarity was stopped, and the "Tommy" of by-gone days became Thomas Cruse, "capitalist." A kind, thoroughly honest man, of whom all who knew him are ready to say a good word, he is a familiar figure on the streets of Helena, and to-day is president of a savings bank in the city where a few years ago he was not sure of getting trusted for enough to keep himself alive. As an illustration of the ups and downs of a miner's life, he is a notable example.—*Harper's Magazine.*

"Old Locomotive."

[Written for the Press.]

Five o'clock! Not much use trying for another nap, since we have breakfast in half an hour, and at six we must be off on our journey over the rough mountain road in the heart of the Sierra Navadas.

The air is fresh, cool and invigorating, as it always is in this delightful region, although the sky is thick with smoke on this particular morning, on account of the numerous forest fires which are burning all around us. As they have not yet approached too near to us, we pay little heed to them, but at night they make a grand and beautiful sight as they glow out upon the surrounding mountains, intensified by the darkness.

Breakfast finished, we complete our preparations for the journey, which is to be made upon no less a conveyance than a steam wagon or road locomotive. Many of these vehicles have been constructed, and are doubtless familiar to many, but this one is unique both in appearance and achievements.

Let me give you an idea of its appearance: Three enormous steel-tired wheels, between 6½ and 7 feet in diameter, support the frame, two at the rear and one at the extremity front, where it is centrally mounted so that it can be turned from side to side to guide the machine, without in any way interfering with its propulsion and operation. Upon each side, over the rear wheels, two immense cylinders are fixed at an inclination, so that their connecting-rods take hold of the crank-pins of two cranks upon the ends of the shaft of the front wheel, and side rods connect these cranks with other cranks upon the rear wheels.

Behind the boiler is a broad, low cab in which the fireman takes his place, while the engineer is installed in a lofty open-fronted pilot-house in front of the boiler, and just over and behind the big front wheel. Here are the throttle-valve lever, the reverse lever and the steering-wheel, all within easy reach and under instant control. Here also the invited guest may take his place at an elevation which lifts him comparatively above the clouds of light dust which arise from a road subjected to the wear of constant heavy travel during a long rainless summer, and in a position to oversee the road in front, the engine beneath, and the long train of heavy lumber wagons which are coupled on behind the engine.

Everything being in readiness, the monster starts with slow and labored breathing up the side of the mountain, over the dry beds of winter torrents upon bridges, which, although made enormously strong for the purpose, still excite distrust upon the first passage.

Winding up the sides of the mountain, over roads so rough that it seems as if the ponderous machinery must be broken or disorganized at each jolt (and you know that your own is receiving shocks which paralyze you), it seems impossible that such an apparatus can climb such steep grades. Yet upward it goes, steadily and without hesitation, breathing harder as the grade grows steeper, until the summit is reached.

The sun now begins to reach us for the first time, and the forest fires are now very near to us. How grandly they sweep along, devouring the underbrush and smaller trees as they are reached. Now they have surrounded an enormous cedar, whose dense green foliage seems capable of resisting all their attacks.

The fire appears to have burned out around the base of the tree, and to be passing on, when suddenly, with a roar which can be heard for a mile, a column of flame springs upward like an immense crimson sheet, and in an instant envelops and shrouds the whole height of the tree, and shooting a hundred feet above its topmost branch, is gone in a flash and in less time than it takes to tell it.

Look again, and in place of the tree with its robe of vivid green, there stands a dead and naked trunk, with bare arms standing stiffly out from its sides from base to crest.

Now the fire approaches dangerously near to the snow sheds of the Central Pacific, which winds its tortuous way along the distant ridges upon the opposite side of the deep canyon separating it from us, and anon the fire patrol of the sheds, the water train, comes shrieking through the sheds with lightning speed. It stops, a coil of hose rolls down the steep embankment, and in a marvelously short time a stream from the powerful pumps of the engines is hissing in the flames, upon which for a time it seems to have but little effect. The fire creeps slowly toward a high trestle, and they redouble their efforts. We can plainly hear their shouts, as we turn a sharp curve and pass over the brow of the hill and commence the descent into another deep canyon which we must cross, to climb another mountain before we reach the mill where we are to leave our empty wagons and take a full train loaded with lumber.

At intervals we stop at little wayside tanks to replenish our water supply, and at the same time to take on some wood, which, being plenty here, serves for fuel.

Sparkling springs, cold as ice and clear as crystal, break from the mountain-side and invite a stoppage which is often made.

Arrived at our destination, we leave our empty train and couple on to a load which it seems literally impossible for the machine to haul over the road we have just passed. Notwithstanding it has been a semi-daily task for more than

a year past, I could not help feeling that for once there was a load which must bring us to a standstill. But no; the giant machines started with its load and steadily onward and upward it dragged those loaded wagons, with no other signs than the heavier breathing of the exhaust.

Grades of one in twelve, one in nine, and in one case for a short distance one in five and a half, were overcome with apparent ease, and in many cases around curves at the same time, which left the rear of our train entirely out of sight.

Just as we were passing a sawmill-yard, a man appeared running around a sharp turn in the road ahead, frantically waving his hands for us to stop. This we did upon a sharp grade, and soon two enormous log trucks appeared coming down the hill and turned into the road just in front of us leading to the yard. Ten yoke of big oxen to each truck coming downhill, and yet all of them could not have pulled our load up the hill we were now commencing to ascend.

As soon as the trucks were out of the way, we again started, our giant moving the load on the sharp grade where we had stopped, apparently as easily as on a level.

And now for two miles steadily onward and upward does the engine drag that heavily loaded train, with not a stop or falter over rough corduroy bridges and rocky roads which give the severest shocks; but although I watched closely I could detect not the slightest tendency to slip, even upon the worst part of the road.

Grades were overcome with a load of 25,000 feet of lumber, which the best locomotive upon a track could not pull itself over. Three wheels with 14-inch face, steel tires and no especial roughening except the rivet-heads of the tires, furnish a traction sufficient to pull the strongest locomotive backward upon a level. This engine has hauled a load of 130 bales of hay over the road above described, including one short rise of three feet in sixteen and a half.

Upon the ordinary country roads of the valley, such a machine would be invaluable as a feeder for a main line of any description, as it could certainly make daily trips out and back of 26 miles each way, hauling loads proportioned to the character of the road. None that I have seen are nearly so hard as the one where the machine has worked for more than a year without break-down or accident.

Two trips a day are made to the mills 6½ miles distant, and six wagons carrying from 20,000 to 25,000 feet, form a load, which in round numbers makes nearly 50 tons, besides the weight of the engine itself.

A million feet of lumber per month is easily hauled, this being the record for July over the above-described road, and it is said that more could be hauled if it were ready.

It is certain that the return trip could be made equally profitable in localities where a load could be had each way, and in agricultural sections the machine could be utilized to haul gangs of plows at the proper season, and to haul grain and merchandise upon the roads. The broad wheels acting as rollers would improve most roads over which they would pass.

The machine is easily handled, turning around and backing as easily as an ordinary wagon.

Corporation Wrecking.

Railroad wreckers were roughly handled in a decision rendered in Chicago last week, by Judge Tuley in the case of the Smith Bridge Co. vs. Henry Crawford. The plaintiffs claimed that in 1882 they constructed two bridges over the Wabash river for the Chicago & Great Southern railroad, under contract for \$21,000; that Mr. Crawford, who undertook to build the road, did so under a construction contract, having claimed that he had no interest in the company, whereas, in fact, he owned \$2,400,000 of the stock. It was further claimed that this construction contract was made through a dummy board of directors, the contract being made to himself; that as soon as the contract was completed, he caused a mortgage he held on the railroad to be foreclosed, and a receiver for the entire assets appointed. The old company being thus burst up, a new company was created. In this way every creditor of the old company, including the complainants in the present suit, were left without any means of satisfying their claims. "The time has come," said the Judge, "when the courts must rise equal to the emergency that is now upon them, equal to the changed conditions and methods of transacting the affairs of corporations, and hold that the manipulators of corporations do not lose their identity because they hide behind corporate forms and proceedings. Trusts, heretofore unknown to the law, are formed to manipulate corporations, by which the people are oppressed and the powers of the State defied. Corporation wrecking has become an established practice, and parties even use the forms of a Court of Equity for that purpose. Advanced ground must be taken, and these manipulators of corporations, whether 'trustees' or 'wreckers,' must be held personally accountable for corporate assets which get into their possession, and for all profits made by their manipulations in their private interests of corporate property or corporate franchises. The courts must in such cases apply the rule which Courts of Equity apply in all other transactions, and deal with the real party, the moving party, the real actor, and will grasp the substance without regard to the obscuring forms under which it may be hidden."



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TABLE OF CONTENTS.

EDITORIALS.—Comparative Mythology; Engine Lathe; Copper Ore in Heaps, 189. Passing Events; Mineral Zones and Mountains; Mining and Our Mineral Resources; Samples and Results; The Russell Leaching Plant, 192. Arizona's Fifth Industrial Exposition; Wooden Pipe Manufacture in Olympia, W. T., 200.

ILLUSTRATIONS.—The Lodge Davis Engine Lathe, 189. Details of Complete Plant for Russell Process, 193.

MISCELLANEOUS.—The Russell Process, 190. The Salt Beds of South America; Natural Gas and the Brine Wells of China; A Miner Who Made \$12,000,000 Road Locomotive; Corporation Wrecking, 191. The Poorman Concentrator; Circular Sewer Covers, 195.

MECHANICAL PROGRESS.—Tempering Springs by Electricity; A Compound Engine with a Single Cylinder; Working Steel; Rolling Gut Chains of Wrought Iron, 194.

SCIENTIFIC PROGRESS.—The New Sugar Substitute; Modern Magic as Applied in Coal; The Suez Canal and Atmospheric Changes; A Hatful of Cotton in a Glass; The Alcohol; The Electric Age; An Improved Telephone; Weighing Thought; Does the Moon Influence Earthquakes, 194.

USEFUL INFORMATION.—Spiders' Webs in the Meadow; A New Wood Pulp Process; The Qualities of a Good Rope; Electric Light Carbons; Dimensions of Water Pipes; India Paper; A New Lamp Burner; A Remedy for Tender Feet; The Sunflower in Malaria District, 195.

GOOD HEALTH.—Blood Poisoning from Dyes; A New Way to Induce Sleep; Massage as a Health Restorer; To Stop Bleeding at the Nose; Is There Any Death from Old Age; A New Disinfectant; Microbes; Lemons in Hot Weather, 195.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 196-97. MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 200.

Business Announcements.

[NEW THIS ISSUE.]

Wire Works—D. D. Wass.
The New Chemical Gold Mining Co.—Meriden, Ct.
Paints—Paraffine Paint Company.

See Advertising Columns.

Passing Events.

During the past week more phenomenal weather in California. Beginning on Sunday, and continuing for two days, much thunder and lightning with heavy showers, the latter extending over most of the State. With this electrical display there will be need for amending the meteorological record of California, the lightning for the first time in the history of the State having been attended with fatal results, two or three deaths from this cause being reported. A Chinaman is said to have been killed here many years ago by an electrical stroke, but the cause not being well authenticated, these recent disasters may be regarded as the first of the kind occurring in the State.

As the day of the great quadrennial election approaches, the situation becomes exciting and partisan feeling intensified. All is noise and turmoil, the great political whirlpool drawing in the local float, and so engulfing it that it will be some time before it again comes to the surface.

From all parts of the mineral domain reports continue favorable, indicating a generally progressive condition of things, and at least an average production of millions for the current year.

Mineral Zones and Mountains.

A glance at a map or orographic chart of this coast shows, aside from the great mountain chain, a general parallelism of ranges and ridges, with a prevailing northwest trend. The materials of this immense mountain area are infinitely varied, ranging from the earliest to the most recent deposits, and embracing almost all known spaces of sedimentary and eruptive products. Clarence King's Exploration of the 40th Parallel demonstrated that all the parallel ranges of the Great Basin, including the chain of the Wahsatch (its Eastern wall) belong to the same system of upheaval, and that while the Pacific built upon the western base of the Sierras those fringing deposits of sand and clay, which thickened through the undisturbed period of the cretaceous and a wide range of the tertiary, the Atlantic, or, more exactly, the ocean which covered the Mississippi basin, heaped upon the east flank of the Wahsatch and laid down a series of cretaceous and tertiary strata, exactly corresponding with the coast deposits of the Pacific. At length, after accumulating to an extraordinary thickness, these outlying and later shore-heds were themselves folded into mountains parallel and astride of the earlier system.

One of the plates accompanying King's Exploration of the 40th Parallel is a section of the Warren map of the U. S. Engineer Department. This section given includes the main central region of the Great Basin, with a part of the coast system of California, and the outlying chains of the Rocky mountains. A brief study of this map will teach the one great and prominent law of arrangement of Cordillera mountain chains, namely, that they trend from north to south, or northwest to southeast; in other words, longitudinally with the main axis of the whole system of elevation. In strict subordination to this longitudinal direction of ranges, says King, are grouped all the structural features of local geology. The average strike of the great areas of upturned strata is generally with the meridian. All the larger outbursts of granitic rocks conform to it as well, since their rents are most commonly the axial lines of actual folds; and, lastly, when the tertiary uplift occurred, its ranges bordered the older mountains in parallelism, and the volumes of lavas accompanying it found exit through longitudinal rents, and either built themselves up along the ancient lines of structure or through new fissures, piled up chains of volcanoes conforming in trend with the general north and south plan.

Over these adobe mountains are found localities of the precious metals, and it is not surprising to observe that, following its leading structural idea, they appear to arrange themselves in parallel longitudinal zones.

This zonal parallelism was first indicated by Prof. Wm. P. Blake in a note in his "Catalogue of California Minerals." It is obviously true, as he has indicated, and King thinks that it is probable that the idea could be carried much further than he has done. The Pacific Coast ranges, upon the west, carry quicksilver, tin and chromic iron. The next belt is that of the Sierra Nevada and Oregon Cascades, which, upon their west slope, bear two zones, a foothill chain of copper mines, and a middle line of gold deposits. These gold veins and the resultant placer mines extend far into British Columbia and Alaska.

Lying to the east of this zone along the east base of the Sierras and stretching southward into Mexico, is a chain of silver mines, containing comparatively little base metal and frequently included in volcanic rocks.

Through Middle Mexico, Arizona, Middle Nevada and Central Idaho, is another line of silver mines, mineralized with complicated association of the base metals, and more often occurring in older rocks. Through New Mexico, Utah and Western Montana lies another zone of argentiferous galena lodes. To the east again the New Mexico, Wyoming and Montana gold belt is an extremely well defined and continuous chain of deposits.

COAL IN INDIA.—There is very little reason to doubt the prediction of Sir W. W. Hunter and others that India will some day become a large coal producer. There are now 105 collieries open in India, 69 of which produced 1,388,407 tons in 1886. The imports of coal during the same year were 848,878 tons. The

Bombay mills use imported coal entirely, there being no coal mines at present in Western India. The native coal is used chiefly on the railways. Nearly all the existing collieries are situated in the Bengal presidency, but there are two in the Central Provinces and three in Assam. It should be stated that no account is taken in the above statistics of coal-mining in any of the native States.

Mining and our Mineral Resources.

From being one of the most exciting and hazardous the business of mining for the precious metals has become one of the most staid and certain of all our leading industries. In no pursuit, not even farming, are the results better assured than in this. Even in the speculative branch of the business there is, at the present time, less money being lost than in transactions of this kind that have to deal with agricultural or manufacturing products. In the attempts to corner the wheat market last year, there was more money sunk in this country alone than in mining gambles the world over. As compared with operations in oil, coal and railroad shares, even the largest deals in mining stocks seem tame and insignificant.

Not only so, but the unhealthy excitements of former days, with their rushes and ruin, have almost died out. The big strike and the far-off discovery are now but feebly responded to by even the most sanguine and restless. While their announcement quickens a little the pulse of the old-time prospector, it fails to start him off on the long and weary tramp in which he once found such delectation. Though it may sadden the hearts of these veterans, so often the victims of the wild stampede, this change is all in the interest of legitimate and well-ordered mining, which, as the experiences of these later days show, is all the better for such absence of flurry and excitement. As all things else may be pardoned the indiscretions of youth, so may mining be excused some of the follies committed during its juvenile stages, which follies, he it observed, have hardly been greater than those incident to many older and long-established industries.

But mining needs no apology. Its record is its own sufficient vindication. It has established by a hullion output of two and a half billions its right to be classed among the great productive industries of the land. Among all our material interests there are but few that could be sacrificed with less detriment to the common weal of our own country or the cause of civilization than this.

There is reason to believe that the extent of our mineral resources is not fully comprehended, nor the importance of mining properly appreciated by the people at large. Few seem to understand that we have within the limits of the Republic over two million square miles of metalliferous territory, hardly more than half of which has yet been thoroughly explored. To say nothing of Alaska, practically an unknown land, we have thousands of square miles nearer home that have merely been run over in the way of prospecting. Even here in California hundreds of known gold-bearing ledges remain undeveloped, to say nothing of the still greater number that more thorough research will hereafter no doubt bring to light.

We have now in our acquired knowledge of the business what constitutes a sound basis for the prosecution of gold mining in a safe, intelligent and profitable manner. We have also the mines that make this an especially inviting field for the investment of capital. We do not say this with a view to disparaging the resources or advantages of our neighbors. But California being an older mining country, naturally possesses greater facilities for engaging in and carrying on the business than her juniors. In the matter of transportation, the construction of machinery, climate, wood and water supply, and various other particulars, we may justly claim for this State some preference in a mining point of view. The mild winters that prevail throughout most of the mining districts of California alone insure to her great advantages over more elevated regions and northern countries.

As for Alaska, however great her mineral wealth, exploration and development will have to be carried on there subject to many drawbacks. But then there is no hurry about that country; its resources, like the north pole, will keep.

Samples and Results.

Not long since an old subscriber of the PRESS sent some ore to this city to be sampled and assayed, not being satisfied with the results he had obtained at local establishments where he was working his mine. He professed to have been careful to select an average of his ore, though the result showed that, as is commonly the case, a better class of ore had been sent than the general run of the vein. Of course the assayer here could only work on samples from the few sacks sent to him. On the basis of these assays, however, our friend sent a quantity of his ore to a custom-mill and was again disappointed.

In judging of the comparative efficiency of various mills or methods by the results obtained on a large scale, it is important to remember that the assay, which is the only standard to which the results are referred, is not infallible.

Notwithstanding all the care exercised by parties interested, even when a great number of samples are selected for assay, the result after all is only an approximation of the truth. Some portions of a given particle of ore may contain free gold or segregated particles of rich silver ore, which quite escape due representation in the samplings, or the contrary may occur, and the value of the particle be overestimated. Further, the variable amount of moisture on the ore affects the result, since the assay is of the dried sample.

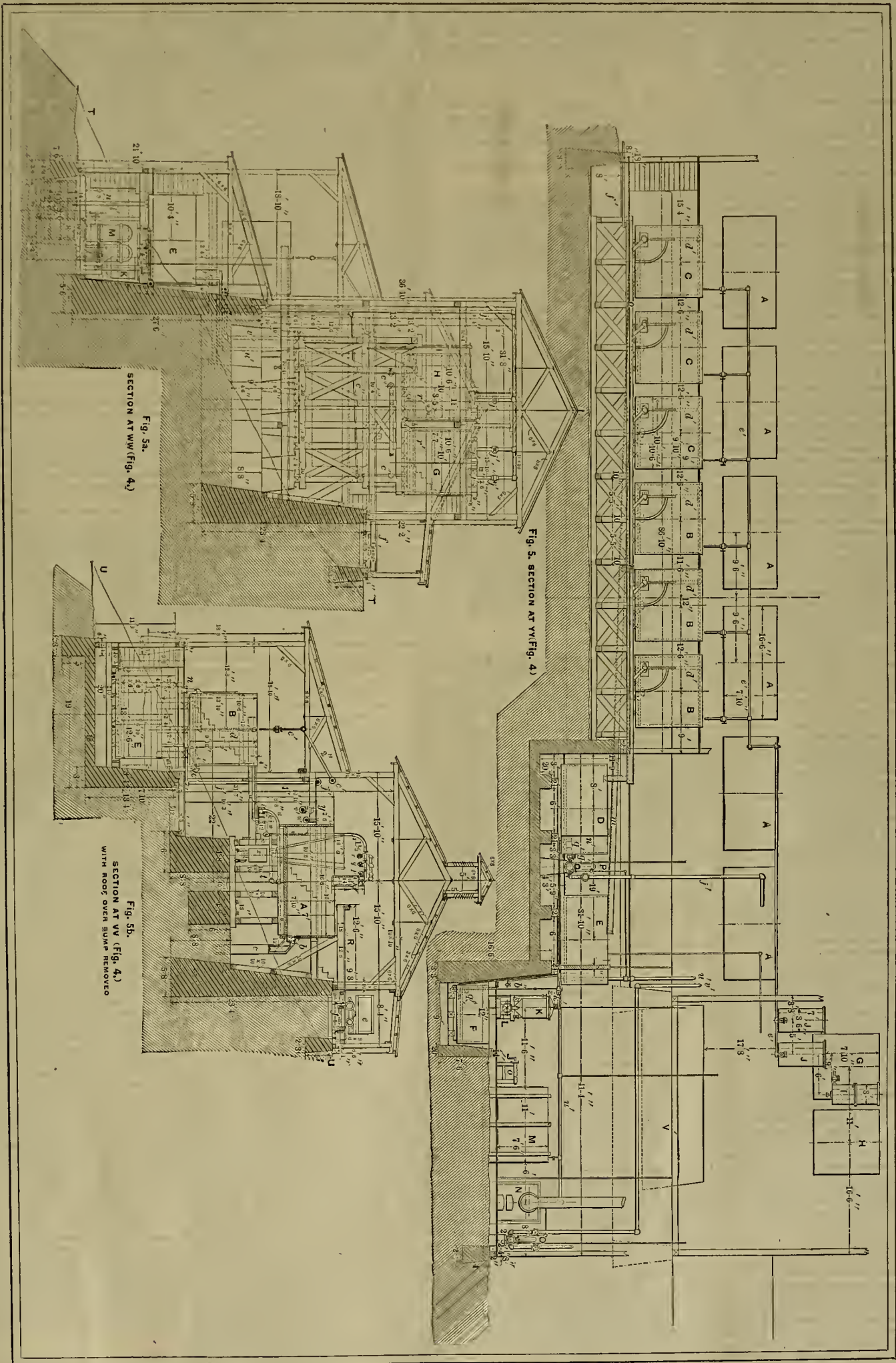
Finally, some ores produce in crushing very variable quantities of slime, on account, partly, of the character of the gangue, some being more clayey than others, and partly by reason of the varying conditions present in the batteries, the weight and speed of the stamps, the size of the screen, etc., affecting the proportion of slime carried. These slimes carry with them a certain percentage of the value of the ore, and the relative amount of slimes and coarser sand produced in the crushing of any given pound of ore becomes an important element in the consideration of the results obtained, whether the former pass out of the mill without treatment or whether they are mixed with the sand and worked in pans, especially if, as seems to be the case, the finely divided condition of the particles composing the slimes is unfavorable to amalgamation.

The Russell Leaching Plant.

In the PRESS of August 25th we gave engravings of part of the plant of the Russell process, showing plan and section. We herewith present other cuts showing other sections of the plant, suitably lettered. Corresponding letters refer to corresponding parts in these and the cuts previously given, and we reproduce as follows the index to parts of plant:

A. Leaching-tanks; B. Solution-precipitating tank; C. Wash-water; D. Solution pump sump; E. Storage-tank for sulphides; F. Filter press sump; G. Storage-tanks for solution; H. Storage-tank for hot solution, or for preparation of extra; I. Cast-iron tank for preparation of sodium sulphide; J. Sheet-iron tank for storing sodium sulphide; K. Iron pressure-tank; L. Filter press for sulphides; M. Steam-drier for sulphides; N. Boiler; O. Fire pump for sluicing; P. Solution pump; Q. Main ore track to leaching-tanks; R. Side tracks to leaching-tanks; S. Side tracks in chemical-room; T. Grade line between boiler and steam-drier; U. Grade line through sulphide storage-tanks; a. Tailings chute (to cars); b. Sluice gate for tailings; c. Sluice trough for tailings; d. Box for chemicals for extra solution; e. Ore car; f. Ore-car truck; g. Chemical car; h. Special extra trough over leaching-tanks; i. Solution trough over leaching-tanks; j. Solution trough to solution precipitating-tanks; k. Wash-water trough to wash-water precipitating-tanks; l. Waste-water trough; m. Trough to conduct sulphides to sulphide storage-tank; n. Trough to conduct solution to solution pump sump; o. Waste wash-water trough; p. Solution pipe to leaching-tanks; q. Hot-solution or extra-tube pipe to leaching-tanks; r. Water pipe to leaching-tanks; s. Hose for circulating extra; t. Hose from leaching-tank to siphon pump; u. Hose from leaching-tank to triple launder; v. Hose from siphon pump to triple launder; w. Siphon pump; x. Tailing car; y. Hose connections for sluicing; z. Waste-water pipe from triple launder; aa. Solution precipitating-tanks; bb. Pipes from triple launder to wash-water precipitating-tanks; cc. Valve or "gate" for sulphides; dd. Surface discharge for precipitating-tanks; ee. Sodium sulphide pipe; ff. Pipe for precipitated wash-water; gg. Connection between solution pump and sump; hh. Box and strainer around outlet; ii. Drip pipe from solution pump; jj. Pipe from pump to storage-tanks; kk. Connection between sulphide storage-tank and pressure-tank; ll. Connection between pressure tank and press; mm. Siphon pump in filter press sump; nn. Solution pipe to sodium sulphide storage-tanks; oo. Pipe for drawing off sediment from pump sump; pp. Pipe for returning solution to solution pump; qq. Small windlass for steam drier; rr. Boxes over storage-tanks to prevent agitation of the solution; ss. Boxes and strainers around outlets; tt. Lead heating coils in storage-tanks; uu. Drip from lead coils; vv. Triple connection between the three storage-tanks; ww. Main steam pipe; xx. Water pipe from fire pump for sluicing; yy. Storage room for caustic soda and sulphur; zz. Storage room for bluestone and hypsulphite; aaa. Trapdoor to filter press sump; bbb. Gauge valve on side of pressure-tank; ccc. Pipe for drawing off sediment from solution storage-tanks; ddd. Siphon pump for circulating solution through chemical-box in extra solution-tank.

"ROAD LOCOMOTIVE" should be the title of an interesting article on page 191 of this issue.



DETAILS OF COMPLETE PLANT FOR THE RUSSELL PROCESS.—See opposite page.

MECHANICAL PROGRESS.

Tempering Springs by Electricity.

There seems to be no end to the application of electricity in the arts. Its application for welding promises to be one of its most useful and notable purposes. One of the latest advances in this direction we find in a late number of the *Industrial World*, which reads as follows:

The subject of tempering spring wire and ribbon by the introduction of a current of electricity as an agency for raising the temperature of the metal to the required heat, has been engrossing the attention of several Chicago gentlemen who have interested themselves in the experiments of Mr. Frederick Sedgwick of this city, the inventor of the process. While Mr. Sedgwick's work has thus far been more especially confined to the tempering of watch main-springs, he has carried out the plan of putting the finest kind of fire temper into round wire, which can be used to great advantage in numerous articles of which more will be said hereafter.

The process by which the inventor tempers steel for watch-springs is very simple and inexpensive. In the first place, he is enabled to temper the steel in continuous lengths of any number of feet or yards, instead of cutting it up into the proper length for one watch-spring, and treating each separately. The greatest difficulty met with in tempering a fine piece of steel, such as that for a watch-spring, by any other process, is the oxidation of the surface of the metal by contact of the heated surface with the air, and also the buckling or twisting of the ribbon on being plunged into the oil-bath. Both of these troublesome points are effectually eliminated by Mr. Sedgwick's process. It is an important achievement, for where the surface of the spring is oxidized in the old method by the heated air in the furnace, as it always is, it has to be rubbed, dressed down, and polished, piece by piece, with emery, until a smooth surface and uniform gauge are obtained; and where the strip of metal is twisted, it has to be straightened out by hand before the temper can be drawn. So much for the old process.

In the new method the soft steel is wound, like a long, narrow ribbon, on a large spool as it comes from the splitting rolls. The ribbon then passes through a set of very fine but powerful rolls which give it a perfectly even gauge of the desired thickness of the finished spring. The soft steel is again spooled, and is ready for the hardening process. From the spool the ribbon passes a point of contact of an electric current from a dynamo, the ribbon itself there forming a circuit by extending to a second point of contact. Midway between the two points, and at the place where the ribbon has received the greatest heat (it being raised to a bright red), it passes into and through an oil bath. The second point of contact is in the further end of the bath, so that a greater portion of the current is taken up in the oil. There is a simple device in the bath for preventing the metal from twisting and kinking, and which also effectually eliminates all oil-bubbles which would otherwise form on the surface of the steel, and thus make it rough. The ribbon, it should be understood, passes through the apparatus continuously at the rate of several yards a minute, and when it emerges from the oil bath it possesses a perfectly uniform temper of great hardness. The fine polished surface given the ribbon by the finishing rolls is not in the least destroyed, and all that is required is to remove the burned oil by the buffing machine, and smooth the edges by an automatic grinder. The temper is then drawn to the required degree and color by a current of electricity, and at this point the temper is automatically gauged. It is then ready to be cut into suitable lengths, and coiled ready for market.

For coil springs such as are used in the magazines of repeating firearms, and light coils of almost any other kind where a reliable spring must be had, the Bessemer electric tempered wire can be advantageously employed, as it can be "hot set." Mr. Sedgwick has a device for giving the wire its proper temper while in the coil. A spring thus made has a much longer life than any other spring coiled in a cold state. Very superior crinoline wire and piano strings can also be thus made. By a slight change in the application of the principles Mr. Sedgwick has successfully case-hardened common soft iron wire. Experiments showed that with Nos. 8 and 9 wire the case-hardening extended through one-third the thickness of the wire. But the remarkable feature of this was that while the surface became so hard that it could scarcely be touched with a file, the wire itself retained its pliability to a wonderful degree. This wire would enter very successfully into the manufacture of wire cable and rope of all kinds.

A COMPOUND ENOINE WITH A SINGLE CYLINDER.—The great advantages of the compound system have long been established, but the necessity of having two cylinders makes a compound engine costly. An engine has been placed upon the market in England, which, it is claimed, combines the economy of the compound system with the cheapness of the single-cylinder engine. This engine has only one cylinder, but the area of the piston in the lower side is reduced to one-third of the full area by means of a trunk. Steam is first admitted into the lower or high-pressure end of the cylinder, and is out off at from half to three-quarter stroke. The steam thus partially expanded in

the high-pressure end of the cylinder is admitted at the completion of the stroke into the other or low-pressure end, when it is expanded to the full extent. The arrangement of valve and ports is stated to be extremely simple and effective, and the diagrams which the engine gives excellent. The advantages claimed for this engine are that it has fewer parts than any other compound engine, and that it can therefore be manufactured at a lower price. The makers are selling them at the same price as an ordinary non-compound engine of the power.

Working Steel.

A thousand useless notions hamper the steel-worker. He is bound down by "processes and personal secrets." He tries to make each two kinds of steel he uses work alike, and he fails. Early training with a certain kind of steel is carried along to hurt his work when some other steel is used.

A certain man may have good success in steel-working. His ways are sought by other men, and used, whether fit for other work or not. There is too little judgment used, and too much "do-so-because-you-do" business followed.

Tempering a solid reamer and tempering a shell reamer are two different matters. The man who attempts both alike fails. That is the result—sure.

Most persistent study and practice is necessary to make a good steel-worker, and then, the experience must be combined with natural adaptability for the work.

There are certain properties possessed by steel which are not comprehended, much less understood, by a majority of steel-workers. Among these properties is the quality of steel becoming capable of staying in place after being hardened by heating to 250° or 275° F.

This property of hardened steel was demonstrated to the writer by Mr. T. K. Almond, the "Almond chuck man" of New York. Mr. Almond has occasion to use from 50,000 to 75,000 pieces of steel, all hardened and made to gauge. These pieces are required to be free from spring in hardening, or, in other words, the molecular tension must be removed, so the pieces will stay forever in the form desired.

It has been demonstrated that if a piece of steel, especially hardened steel, be ground to exact shape, and left to itself for some weeks, the form is slightly changed when examined at the end of that length of time. In other words, the internal tension caused by hardening and forging has changed the shape of the steel in its efforts to free itself, so to speak, from the cramped positions occupied by the steel molecules.

According to Mr. Almond's theory, it is only necessary to force the hardened steel into the desired position, hold it there, and heat to 250° or 275°. The metal may then be allowed to cool gradually, or be plunged into the water-bath. In either case, when cool, the steel will occupy the desired position.

As a peculiarity of this method, the hardened steel shape may be forced by a plunger, driven by hammer blows, into a nicely finished cast-iron die or form. Power enough may be used in driving a two-ounce piece of hardened steel into a die to drive a six-inch spike into a pine log, yet after heating to 275°, and the subsequent cooling, the steel object may be removed with the fingers.

The principle of a relaxation of molecular strains by low temperature has been applied by Mr. Almond with good success in straightening fluted reamers, taps and drills. A press is used to put pressure upon the high side of the steel tool. A Bunsen burner or other hot flame is brought into action, and made to affect the tool opposite the pressure.

The desired straightening can be effected to a nicety and certainty unknown by any other method.—*Manufacturers' Gazette*.

ROLLING OUT CHAINS OF WROUGHT IRON.—The process, some time since announced, of rolling out chains of wrought iron from the solid bar, has, with certain improvements, been successfully resorted to—the principle of forming the rollers and the process of rolling out a chain being, in this case, similar in some respects to the method employed for casting the links and having them come out together in a chain from a mold. In the latter operation, the flask is made to part equally in four ways, and the chain molded while the links are separated so as to divide the spaces equally between them, giving as little clearance as possible, which will not change their appearance perceptibly—the flask is divided, the chain is moved, and one is cast in the mold. Similarly, a piece of chain is swaged out of a bar of iron in an analogous manner, by means of four converging dies. Thus, in producing a continuous chain in this way, the dies are made continuous by having them formed on the circumference of four rollers, arranged with dies distributed in equal divisions, and the rollers driven by gear wheels, so that the four parts of a link will meet accurately in place; proper clearance is given to the dies, so as to allow the material to leave the matrix freely as the roller revolves. As the blank is carried forward between the rollers, the dies partially press or swedge out the links at right angles to each other, breaking the fin or feather edge that is left on the inside of the link.

WHAT may be of great value in ship-building and watch-making is the discovery that steel mixed with 24 per cent of manganese becomes non-magnetic.

SCIENTIFIC PROGRESS.

The New Sugar Substitute.

Our readers will remember our occasional references, during the past few years, to the remarkable substance discovered by Fahlberg, and by him termed "saccharine," from the fact that it possessed the property of sweetness to an extraordinary degree. The discovery was announced some four or five years ago, and since then the discoverer has been diligently at work striving to reduce the cost of its production, in order to make it commercially useful for the many applications in the arts for which its very remarkable properties appear to make it suitable. In this effort he has, from all accounts, already been measurably successful, and a factory for the production of saccharine on the large scale has for some time been in operation.

To what extent this singular compound will ultimately be used to replace sugar, it would be hazardous to venture a prediction; but, from the fact that extended experiments with it have shown that it is quite harmless in its effects when taken internally in articles of food and drink, there appears to be nothing in the way of its use upon the largest scale, save its cost. Upon this point we may add that, to insure its successful adoption as a sugar substitute, it will not be necessary that it should be produced at the cost of sugar, since its sweetening power is so much more intense—several hundred times as great—that one pound of the substitute will effect the same amount of sweetening as many times its weight of sugar.

It should be remembered, however, that saccharine has no nutritive properties, and for this reason can never take the place of sugar as a food, even should it become possible to produce it as cheaply as the latter; nevertheless, there is good reason for the hope that it may prove of the greatest value to those who are afflicted with certain forms of kidney disease (diabetes), in which the use of sugar must be strictly prohibited.

MODERN MAGIC AS APPLIED TO COAL.—Though pit-coal has been known for some hundreds of years, the discovery of its numberless products is confined to the present century. Illuminating gas was unknown 100 years ago. Petroleum has been in use only about 40 years, and it is scarcely more than 50 since some one discovered that stone-coal was inflammable. Nearly all the other products derived from soft coal have been discovered and applied in the interests of science or of fraud within the last 25 years. The first thought in regard to coal is that it is made to give heat or warmth; the next, that one of its principal uses is to illuminate. But there are obtained from it the means of producing over 400 shades of colors, among the chief of which are saffron, violet-blue and indigo. There is also obtained a great variety of perfumes—cinnamon, bitter almonds, queen of the meadows, clove, wintergreen, anise, camphor, thymol (a new French odor), vanilla, and heliotropine. Some of these are used for flavoring. Among the explosive agents whose discovery has been caused by the war spirit of the last few years in Europe are two called dinitrobenzene or helite, and picrates. To medicine coal has given naphthalene, salicylic acid, naphthol, phenol and antipyrine. Benzene and naphthalene are powerful insecticides. There have been found in it ammoniacal salts, useful as fertilizers, tannin, saccharine (a substitute for sugar), the flavor of currants, raspberry and pepper, pyrogallol acid, and hydroquinone, used in photography, and various substances familiar or unfamiliar, such as tar, resin, asphaltum, lubricating oils, varnish, and the bitter taste of beer. By means of some of these we can have wine without the use of the grape, beer without malt, preserves without either fruit or sugar, perfumes without flowers, and coloring matters without the vegetable or animal substances from which they have been hitherto chiefly derived.

THE SUEZ CANAL AND ATMOSPHERIC CHANGES.—The Suez canal is the cause of atmospheric changes which may have an effect of great importance in shaping the destiny of Egypt. Rains are now falling in Cairo and along the delta of the Nile, before almost unheard of. Dr. Chas. S. Robinson of this city notices the arrival of "new forces of disruption from without," and climatic changes most unexpected and peculiar, so that even the mummies, so long preserved in their dry cerements, are now liable to perish from the presence of moisture, before unknown, which percolates through their rocky covering. He says: "Whereas at least until 1878 such a thing as rain was entirely unknown in Cairo, there is nowadays one perpetual and almost tropical downpour, commencing in November and lasting until March," which accounts for the prevalence of typhoid and other forms of malarial fever. And, as might be expected, the manner of constructing dwellings and the mode of life are undergoing a radical change. Roofs must now be made water-tight, and "fire-places and stoves have already made their appearance," instead of the old-time open braziers. The prospect of a new market for stoves, so near the equator, and from causes so remarkable, will scarcely escape the attention of American manufacturers. The fact that there is at this time a most unprecedented season of low water in the Nile, actually threatening a famine from the

lack of overflow, does not militate at all with the above, from the fact that the Nile overflows are due to the rainfall in the mountains of Central Africa. No possible amount of rain in Lower Egypt could cause an overflow of the Nile; but it might obviate the agricultural necessity for the same.—*Ex.*

A HATFUL OF COTTON IN A GLASSFUL OF ALCOHOL.—To all matter must be attributed two essential qualities; first, that in virtue of which it occupies space and which is known as extension, and, second, that which allows only one particle or atom of matter to occupy a given space—the property known as impenetrability. That matter occupies space is appreciated by our senses, and needs no particular proof, but that two portions of matter can occupy the same space at the same time sometimes seems anomalous, as is shown by the following experiments recently described and illustrated in *Scientific American*. Into a tumbler filled with alcohol may be crowded a hatful of loose cotton without causing the alcohol to overflow. The success of the experiment depends upon the slow introduction of the cotton, allowing the alcohol to invest the fibers by capillarity, before they are fairly plunged beneath the surface of the alcohol. In this experiment the penetration of the alcohol is only apparent; the fibers displace some of the alcohol, but the quantity is so small as not to be observable. If the cotton were compressed to the smallest possible volume, it would be found to occupy but very little space. So small a body would be incapable of raising the level of the alcohol enough to be appreciable by an ordinary observer.

THE ELECTRIC AGE.—The last 20 years have seen more advance in the science of electricity than all the 6000 historic years preceding. More is discovered in one day now than in a thousand years of the Middle Ages, so that, literally, "a day is a thousand years." We put it to all sorts of uses. We make it carry our messages, drive our engine, ring our door-bell, and scare the burglar. We take it as a medicine, light our gas, see by it, hear from it, talk with it, and now we are beginning to teach it to write. The question naturally arises in contemplating this subject, "What is it?" I can imagine the last man on the last day asking this same question, "What is it?" At one time, not long ago, it was supposed to be a fluid; by some two fluids, a positive and a negative. But in this day there are few who do not believe it to be simply a mode of motion; not matter, but a condition of matter; and not a mechanical, but a molecular motion. By mechanical motion is meant a motion of the mass, and by molecular motion is meant a motion of the ultimate particles of which the mass is made up.—*Ex.*

AN IMPROVED TELEPHONE.—An inventor has devised an improvement on the telephone which it is claimed will be of great practical advantage. The arrangement is contained in a small box, which is placed in proximity to the telephone and connected by wire. No name has yet been given it. A person is called upon the 'phone, and, if not present, the person speaking continues talking, the communication being electrically committed to wax-paper within the machine. When the person addressed arrives at the other end of the wire, he notices that a hall has dropped on the apparatus, which indicates that some one has been talking. Going to the 'phone he opens the switch, when all that has been said previously by the person at the other end of the line commences to be heard in precisely the same tone of voice and at the same rate of speed. The sheets of paper are 8 by 11 inches, and can at any time be placed in the machine and the sound be reproduced.

WEIGHING THOUGHT.—Starting with the idea that the hand varies sensibly in size with the amount of blood present in it at any moment, Professor Mosso, an Italian physiologist, has made some most interesting investigations. In his first experiments the hand was placed in a closed vessel of water, when the change in the circulation produced by the slightest action of the body or brain, the smallest thought or movement, was shown by a rise or fall in the narrow neck of the vessel. With a large balance, on which the horizontal human body may be poised, he has found that one's thoughts may be literally weighed, and that even dreams, or the effect of a slight sound during slumber, turn the blood to the brain sufficiently to sink the balance of the head. The changing pulse even told him when a professional friend was reading Italian and when Greek, the greater effort for the latter duly affecting the blood-flow.

DOES THE MOON INFLUENCE EARTHQUAKES?—Observations on the part of a large number of scientists prove that earthquakes are more frequent at the time of full moon and change of the moon than at other times, and also more frequent when the moon is nearest the earth or when she is on the meridian. The cause to which this fact has been assigned is the action of those forces which produce the tides of the ocean; their similar influence upon the solid land strata leads to their disturbance in the shape of earthquakes.

A CURIOUS PHENOMENON of last January has just been reported from the fishing village of Kersokharanza, on the White sea. The shore ice, piled to a height of several hundred feet, suddenly commenced moving from the north-west, and in four hours extended a mile inland, burying a village.

USEFUL INFORMATION.

Spiders' Webs in the Meadow.

I read a statement in this magazine, not long ago, about the spiders' webs that cover the fields and meadows on certain mornings in the summer, which was not entirely exact, writes John Barron in *St. Nicholas* for August. It is not quite true, in the sense in which it was uttered, that these spiders' webs are more abundant on some mornings than on others, and that they presage fair weather. Now, the truth is, that during the latter half of summer these webs are about as abundant at one time as at another; but they are much more noticeable on some mornings than on others—a heavy dew brings them to view. They are especially conspicuous after a morning of fog, such as often fills our deeper valleys for a few hours when fall approaches. They then look like little napkins spread all over the meadows; I saw fields last summer, in August, when one could step from one of these dew-napkins to another for long distances. They are little nets that catch the fog. Every thread is strung with innumerable fine drops like tiny beads. After an hour of sunshine the webs, apparently, are gone.

Most country people, I find, think they are due to nothing but the moisture; others seem to think that the spiders take them in as morning advances. But they are still there, stretched above the grass at noon and at sunset, as abundant as they were at sunrise, and are then more serviceable to the spiders, because less visible. The flies and insects would avoid them in the morning, but at midday they do not detect them so readily.

If these webs have any significance as signs of the coming weather, this may be the explanation:

A heavy dew occurs under a clear, cool sky, and the night preceding a day of rain is usually a dewless night. Much dew, then, means fair weather, and a copious dew discloses the spiders' webs. It is the dew that is significant, and not the webs.

A NEW WOOD PULP PROCESS.—The Mitscherlich wood pulp process is thus described by the *Southern Trade Gazette*: About two shovelfuls of flour of sulphur are thrown into the furnace every hour and there allowed to smolder while the fumes rise from it. Above the furnace is a series of cooling pipes, upon which a spray of water continually plays and through which the fumes pass into the vats containing the water and milk and lime. The fumes are drawn through the system of vats by a large vacuum engine, and all the vats are provided with revolving dashers, which agitate the liquor and facilitate the action of the sulphur fumes upon it. The machine that chips up the logs is a large one, and can devour an eight-inch log with ease; and the chips are considerably finer than in the soda process. A blast blows the chips into a bin, from which a conveyor takes them to the digester. After sufficient treatment in this the contents are discharged into a blow pit, whose ventilator shaft is provided with a trap to prevent the escape of any of the product. The success of this plant will lead to the construction of another and larger one.

THE QUALITIES OF A GOOD ROPE.—A German paper, in an article on the present methods of rope manufacture from hemp, and the determination of the different qualities and probable strength simply from the appearance, lays down the following rules: A good hemp rope is hard, but pliant, yellowish or greenish-gray in color, with a certain silvery or pearly luster. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while fibers were damp, and is, consequently, weak and soft in those places. Again, sometimes a rope is made with inferior hemp on the inside, covered with yards of good material—a fraud, however, which may be detected by dissecting a portion of the rope, or, in practiced hands, by its behavior in use; other inferior ropes are made from short fibers, or with strands of unequal length or unevenly spun—the rope in the first case appearing woolly, on account of the number of ends of fiber projecting, and, in the latter case, the irregularity of manufacture is evident on inspection by any good judge.

ELECTRIC LIGHT CARBONS.—Of 150,000 carbons burned daily in the electric lights used in the United States, 100,000 are manufactured in Cleveland, Ohio. Six years ago all the carbons burned in this country were made in a single room in Boston. Now there are 20 carbon furnaces in Cleveland alone. The carbons are made chiefly of the residuum of oil after it has been refined, and the deposit about natural-gas wells is also coming into use. The material is ground to a powder, a little pitch is added, and the substance is then placed in molds. These are packed in boxes and the latter placed in a furnace, where they are subject to the most intense heat. The capacity of an ordinary furnace is 45,000 carbons.

DIMENSIONS OF WATER-PIPES.—In the case of laying pipe to convey water from an elevation through a considerable fall, a prominent expert of Nordhoff, Ventura county, Cal., has kindly furnished the following opinion regarding the dimensions of the pipe laid. He says: "As to the beneficial effects on the flow

by introducing a large mouth-piece in the pipe, this influence comes if the pipe has a length of more than 2000 times its diameter. If, for instance, a six-inch pipe is 1000 feet in length, its discharge is not increased by this means. As the pipe shortens this influence increases, so that, if the six-inch pipe were only 250 feet long, a mouth-piece would add about 7 per cent to the flow; if 50 feet long, about 13 per cent; if 25 feet long, about 18 per cent; and if 5 feet long, about 31 per cent. For the most economical use of pipe on long lines it is preferable to use a pipe of uniform diameter."

INDIA PAPER.—India paper, which the Chinese call *lehi*, is made from hemp, mulberry bark, cotton, bamboo, rice straw, barley straw, and from the interior membranes of silkworm cocoons. Sometimes the whole of the stalks of a year's growth are used. The pulp is mixed, after it has been prepared, with a given proportion of a vegetable gum called *hotong* in China. This paper is molded in molds made of fine bamboo filament. These sheets, 60 feet in length, which the Chinese are said to make, are supposed to be fabricated by artfully joining several small sheets at the moment of laying the paper. India paper, being too thin to bear handling or any strain, is mounted on vellum, which serves as a lining to it, and the white borders of which set it off as a frame would do. The sheets are kept in a dry place, far away from the fire, and may be preserved for years.

A NEW LAMP-BURNER.—A lamp-burner has been patented by Mr. Arthur Cautius of Berlin, Germany. The wick tube consists of two concentric tubes, with a space between them for the wick, the inner tube being shorter and the outer one longer and provided with a flange covering the top of the wick, the burning portion of which will be on the inside instead of the top, between the flange and the top of the inner tube.

A REMEDY FOR TENDER FEET is cold water, about two quarts, two tablespoonfuls of ammonia, one tablespoonful of hayrum. Sit with the feet immersed for ten minutes, gently throwing the water over the limbs upward to the knees. Then rub dry with a crash towel, and all the tired feeling is gone. This recipe is good for a sponge bath also.

THE SUNFLOWER IN MALARIAL DISTRICTS.—It is stated that since the sunflower has been cultivated on certain swamps of the Potomac, malarial fever has decreased. The sunflower emits large volumes of water in the form of vapor; and its aromatic odor, as well as the oxygen it exhales, may have to do with the sanitary influence in question.

GOOD HEALTH.

Blood-Poisoning from Dyes.

Some journals take great pleasure in communicating sensational stories about terrible blood-poisoning cases from garments which were dyed with alleged "poisonous dyes," often corroborated by the statements of physicians; but, strange to say, remarks the *Textile Colorist*, we never hear of blood-poisoning among dyers, who daily handle those so-called poisonous dyes, even with chapped hands, as abrasures and small cuts in the hands do not unfrequently occur in the dyer's work, and they would certainly be the persons most exposed to blood-poisoning if the disease were attributable to the dyes.

Editors, even of technical papers, however well posted they may be in other matters, who make capital out of such alleged "blood-poisoning" cases, are probably seriously deficient in knowledge as to dyeing operations and processes; and much less knowledge of these operations and processes can be expected in doctors who, without hesitation, prescribe small doses of poison to be taken internally, but do not know how infinitely smaller actually is the quantity contained in a garment, through dyeing, of any poisonous substance possibly used in manufacturing a dyestuff or mordant. The testimony and opinion of physicians, who often want to shine in the light of great learnedness, or find it in their interest to represent an uncommon case of disease as most dangerous, and who but rarely have an occasion to apply their, at best, but imperfect knowledge of chemistry, must sink into nothingness in the presence of the statements of chemists who must be considered authorities by the extensive practical application of their science in cases of that kind. In the annual official report on the work of the public laboratory in Dresden, we find the following remarks on the interesting question of blood-poisoning by dyed garments:

Special investigations have been instituted regarding the question, whether certain tar dyestuffs, especially azo dyestuffs, were to be included in the law concerning the use of dyestuffs injurious to health. They were left out, however, because experience affords as yet too little proof of the harmlessness or injuriousness of these dyestuffs.

In this laboratory numerous cases were investigated in the course of the year where garments dyed with aniline dyestuffs were alleged to have caused eruptions upon the skin. There were red dyed stockings (the hobby of doctors), green silk ribbons, blue wool. In all cases the objects suspected of being dyed with poisonous dye were submitted for examination; but in no case deleterious dyes, in the sense of the law,

could be detected. All the dyes were free from arsenic, as altogether the aniline dyestuffs containing arsenic have nearly entirely disappeared in commerce.

The question about the injuriousness of aniline dyestuffs can only be decided by means of physiological experiments upon animals, and the questions concerning the production of eruptions upon the human skin will probably be very hard to solve, because there, besides the mordants and the textile material itself, the greater or less susceptibility of the individual must be taken into consideration. In fact, in by far the majority of cases which have come under my knowledge, only a very uncertain opinion could be formed as to whether the material, the mordant or the dyestuff had most contributed to produce the irritation of the skin, or the eruption.

A New Way to Induce Sleep.

The *London Spectator* makes the following novel and apparently philosophical suggestions:

"It is now, I believe, generally accepted that our conscious, daylight-thinking processes are carried on in the sinister half of our brain—i. e., in the lobe which controls the action of the right arm and leg. Pondering on the use of the dexter half of the brain—possibly in all unconscious cerebration, and whatever may be genuine of the mysteries of planchette and spirit-rapping, I came to the conclusion (shared, no doubt, by many other better qualified inquirers) that we dream with this lobe, and that the fantastic, unnatural, spirit-like character of dreams is in some way traceable to that fact.

"The practical inference then struck me. To bring back sleep when lost we must quiet the conscious, thinking, sinister side of our brains, and bring into activity only the dream side, the dexter lobe. To do this the only device was to compel myself to put aside every waking thought, even soothing and pleasant ones, and every effort of daylight memory, such as counting numbers or repetition of easy-flowing verses, the latter having been my not wholly unsuccessful practice for many years. Instead of all this I saw I must think of a dream, the more recent the better, and go over and over the scene it presented. Armed with this idea, the next time I found myself awakened at 2 or 3 o'clock in the morning, instead of trying merely to banish painful thought and repeating, as was my habit, that recommendable soporific, 'Paradise and the Peri,' I reverted at once to the dream from which I had awakened and tried to go on with it. In a moment I was asleep! And from that time the experiment, often repeated, has scarcely ever failed. Not seldom the result is hidden as the fall of a curtain, and seems like a charm.

"A friend to whom I have confided my little discovery tells me that without any preliminary theorizing about the lobes of the brain she had hit upon the same plan to produce sleep and had found it wonderfully efficacious."

MASSAGE AS A HEALTH RESTORER.—A writer in *Cassell's Magazine* commends massage as a producer of sound, wholesome sleep in persons afflicted with insomnia. He also claims that lumbago, stiffness in the joints, sciatica and many kinds of headache readily yield to this treatment, and liver and heart complaints are greatly benefited. It may often take the place of exercise when that cannot be easily had. Massage is a splendid tonic to the whole system. It is a safe tonic. Massage keeps the skin in good working order, and all other glands as well. To people troubled with gout and chronic rheumatism it very often proves invaluable, while various forms of paralysis yield to the new-old cure.

TO STOP BLEEDING AT THE NOSE.—A simple plan of stopping bleeding of the nose has lately been advised. Grasp firmly the nose with the finger and thumb for 10 or 15 minutes; by thus completely stopping the movement of air through the nose (which displaces freshly-formed clots) you will favor the clotting of the blood, and will frequently stop hemorrhage.

IS THERE ANY DEATH FROM OLD AGE?—A physician whose practice is in a large and healthy district expresses the belief that death from old age never occurs. He thinks that some attack of disease, however slight and difficult of diagnosis, some intensifying, perhaps, of previously existing chronic disease, invariably brings about the final change.

A NEW DISINFECTANT.—A new and powerful disinfectant, adapted to all purposes, has been obtained in Paris from coal oil. It is a syrupy brown liquid of a not disagreeable odor, resulting from a peculiar saponification of the oil by caustic soda. It destroys moss and fungus on trees, and sponging with a weak solution keeps flies from horses.

MICROBES.—The idea that all microbes are injurious to health, says the *Sanitary News*, is a very common one, even among those who pose for well-informed persons. The fact is that they are now believed to play a not unimportant part in the process of digestion and the transformation of food into assimilable form.

LEMONS IN HOT WEATHER.—A safeguard against the prevalent summer illness lies in the free use of lemon juice. Citric acid helps to supply the places of the fluids which are unduly dissipated through the pores of the skin in hot weather.

The Poorman Concentrator.

This magnificent mill, said to be the largest of the kind in the United States, and probably in the world, was started up yesterday, and it is drawing it very mild to say that a trip through the huge building, with its massive machinery, is a matter of more than ordinary interest. The structure is immediately opposite the Tigor concentrator. It is 193 feet long and 72 feet wide, with a corresponding height. The building is divided into four compartments—the boiler-house, the ore and rock-braking room, the jigger and table-room and the sacking-room. The engine is of 120-horse power, but steam-power will only be used during the dry season.

In the Spring Months

Water-power will be employed, and a flume and wheel are already constructed. The jiggers are different than those in use in the other mills in the camp, and it is claimed that less power is required to run them. The concentrating tables are round and six in number. They are of huge size. A singular feature, however, is what is termed a "grinder," which receives the refuse and after it leaves the jiggers is ground into powder and then pumped back into the jiggers to take its course through the first process. It is claimed that much valuable ore sticks to the small particles in the rock and is thus saved to the company. In the sacking-room there are a number of reservoirs for catching the very fine float concentrates which are lost in other mills in the camp. These reservoirs are in the shape of baths, and it is difficult to see how much of the valuable stuff can escape them. They are supplied with a

Constant Flow of Water.

The mill is very substantially built, and evidently no expense has been spared to make it the most complete institution of the kind ever constructed. Its capacity is 150 tons of ore per day. While this requires an enormous daily production, there is every indication that the Poorman mine will be equal to this occasion and feed the monster with the requisite amount of ration. The developments in the mine show a continuous ore body of from five to seven feet in width for 500 feet, and a double compartment shaft is now being sunk which will open up the mine 100 feet below the water level. A 70-foot shaft has already demonstrated the existence of a fine body of ore on the west end of the claim, and it is natural to suppose it continues all along the fissure. Everything indicates that mining will be done on a broad-gauge plan, and quite naturally more than ordinary interest centers in the movements of the Poorman Co. This mill is a monument of enterprise, and shows the confidence that is felt in our mines by active mining men.—*Murray Sun*.

Circular Sewer-Covers.

The *Young Scientist* takes this subject of circular sewer-covers for its text, and discourses as follows: In ancient times the circle was the emblem of eternity and the symbol of completeness, and these ideas seem to have created a sort of reverence for this emblematic figure, so that it has been regarded as the height of perfection for many purposes. Indeed, such a firm hold did this view take of the general mind, that even the tube with a circular section was at one time considered the strongest form into which any material could be molded, and it produced a great deal of astonishment among those who held this view when Stephenson and Fairbairn showed that the circle was inferior to the rectangle in strength as well as in other points. Is, is, no doubt, the lingering influence of this blind reverence that causes our city engineers to adopt the round form for the covers of the manholes of street sewers. In most of our small cities the round form has been adopted, where very little consideration would have shown that it is one of the worst forms that could have been selected. The reason for this is simple enough! Whenever the street settles or gets worn below the level of the top of the sewer-cover—and most streets in small cities and country villages do get so worn down—unless the wheels of the passing vehicle strike the cover fairly in the center, the edge of the cover acts as an inclined plane to push the wheels to one side, in which case it is sure to give the vehicle a severe wrench. Now, if the cover had been square, or at least rectangular, this would not have occurred. A wheel striking such a cover at any part of its edge meets it squarely, rises over it and rolls across the surface without any hitch whatever.

As it is now, the round covers cause a damage of thousands of dollars to the vehicles in the cities where they are used, and they, themselves, are rapidly destroyed. We have seen some inches worn off a cast-iron sewer-cover by passing vehicles, and the cover nearly destroyed. A square cover would have suffered no such damage.

The Owens River Canal Co. let a contract August 25th to H. H. Spear, for work on the canal, for \$11,000. The distance covered by this agreement is from the head of the ditch to Claussen's, 9½ miles, less the portion now under contract. The ditch must be finished within 18 months.

To MEND PATTERNS, or making additions where but a few molds are to be made, the following solution will be found very useful: Melt together one pound of hesswax, one pound rosin, and one pound of paraffine wax.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—Amador *Expositor*, Sept. 15: Sinking operations have been commenced at this mine. Twelve men are engaged in this work, in three shifts of eight hours each. The rock was found to be so hard that it was deemed too slow for hand-drilling. A machine drill has therefore been called into requisition, and the work will advance much more rapidly.

KENNEDY.—Sinking has been finished in the main shaft of this mine. Drifts have been run north and south at the 1050 level, showing the ore body to exist at that depth in undiminished size and quality. At first the ledge was found rather pinched, but it has since widened out to five or six feet thick. The mill is kept running to its full capacity of 40 stamps. Sinking at the north shaft continues.

MISCELLANEOUS.—It is reported that all arrangements for the sale of the Amador Queen mine in Hunt's gulch have been satisfactorily completed. Mr. Wright, who bonded the Cleveland mine, above Big Bar bridge, and who left for the East with the probability of proceeding to Europe to place the Cleveland and other mines with an English syndicate, has not been heard from for several weeks. One crushing was made by the five-stamp mill, which yielded, we are informed, an average of about \$9 per ton. The Reaves and Way mine, or Plymouth Extension, as it is now called, has been sold to the parties in New York who bonded it over a year ago. The bond was allowed to lapse, but the parties made a cash offer—\$10,000—and that sum has been paid and the matter settled. The Plymouth mine, according to all reports, will start up to-day, Saturday. There is no further trouble apprehended from fire. It will take until November to drain the shaft, and until this is done the damage from fire and flood cannot be ascertained with any degree of correctness.

El Dorado.

NOTES.—*Observer*, Sept. 18: Andrew Ellicott of Slate Mountain has been on a visit to old friends at Smith's Flat for a few weeks. Mr. Ellicott was an early settler in this part of El Dorado county, and was the discoverer of the old New York mine at Poverty point, nearly 30 years ago. Mr. Ellicott is well past the meridian of life, and by untiring industry has acquired an ample competency with which to carry himself easily down the grade of declining years. We were shown, by Marco Vazozza one day last week, some ore taken from a ledge near the Baltic mill, which was remarkably rich in gold. The ledge is nearly two feet wide, on which a shaft has been sunk to a depth of over 50 feet, which prospected big from the grass roots down. The ledge is owned by Marco and L. Campini. The former is now at the Baltic, having departed for that place last Thursday, giving the mine his personal attention. About two months ago Thos. Potts of Smith's Flat started a tunnel to strike a body of gravel which had been tapped from an old tunnel many years ago. In the new tunnel Mr. Potts has made an unexpected discovery, by running into the edge of a channel of ground which prospects \$1.25 to the pan. The bedrock pitches down as the tunnel advances, and with that pitch the gravel increases in thickness.

FROM GRIZZLY FLAT.—Mr. McDonald, supt., has a few men working on the Mt. Pleasant. The ledge is reported to be over five feet wide of good ore. Charley Jones and Lafe Mesmore are running a tunnel at the Dryer mine to strike the ledge, when they expect good ore. Thos. H. Russell and R. K. Clabourne are taking out fine ore from the Mt. Hope mine. The Big Bonanza is turning out rich ore showing galena and free gold. Alex. McAfee is sinking on the Ohio mine and has a ledge now 5½ feet wide of very promising ore.

Fresno.

THE STAR MINE.—*Expositor*, Sept. 12: Messrs. J. M. Shopp of Missoula, Henry Klein and J. L. Waggener of Helena, Mont., are visiting Fresno. They are part owners of the Star mine at Mount Raymond, in this county. They report that they are putting up extensive works for operating the mine. The Mount Raymond mines carry gold, silver and lead. The average of the ore runs about 22 ounces of silver and 20 per cent lead per ton. This ore they intend working by grinding it and concentrating the minerals. The concentrations will be packed and shipped to San Francisco and sold to the smelting works there. The works when completed will have a capacity for crushing and concentrating 100 tons of ore per day, but another season they will double its working powers. They estimate that they can mine and mill the ore for \$1.50 per ton. They describe their mine as a true fissure vein of giant proportions—a perfect mountain of ore, so to speak. The supply of ore is almost inexhaustible. All they have to do is to blast it out and convey it to the concentrating works. They expect to get their concentrating machinery in operation in about 90 days.

Mariposa.

GOOD MINE.—*Mariposa News*, Sept. 15: The old shaft in the old Marguerite mine, now known as the Grove & Ellingham, at Whitlocks, has been cleaned out at last. The bottom level extends a distance of 235 feet on a body of ore that averages two feet, and will mill from \$8 to \$12 to the ton of free gold. The quartz is very rich in sulphurets. This mine gives every promise of being one of the best in the State. The shaft will be put down about 100 feet more, and levels run. A steam pump will be put in at once.

Nevada.

CONSOLIDATED BANNER.—*Transcript*, Sept. 13: The property is located three miles north of Nevada City, Cal., and four miles northeast of the town of Grass Valley, both places being well known and prominent quartz-mining centers. The Banner mine was located by Pressy & Co., in 1863, who worked the mine for a short time and then sold it to Mr. William Tisdale and Mr. George W. Kidd. The latter operated the mine for about two years. We are sure that the mine paid them while they managed it \$250,000, principally in free gold, as the

treatment of sulphurets at this early date was very imperfect and not as assured as at present. The mine has been worked for periods of several years at a time and has produced \$750,000—principally free-milling ore. The vein is a true fissure one in slate walls running north and south, pitching east. The chute is 250 feet in length, averaging 5 feet in thickness; this was worked to a depth of 620 feet. At the time the mine was being operated the milling machinery was inferior to that now in use for free gold, and particularly so for sulphurets, as the latter which contained a large per cent of gold were virtually allowed to be wasted. In those early days they did not have the "Frue Vanner" and other concentrators that are now the necessary adjuncts in all quartz-mills. The processes then of saving the sulphurets were simply crude experiments. Other kinds of mining machinery have been vastly improved, so that to-day, Nevada county, Cal., is the Mecca for persons interested in the treatment of quartz rock. By the great improvement in machinery the ore can now be worked for less than one-half the former cost and the yield of gold will be doubled. During the past year about 100 tons of ore averaging \$50 per ton were taken from the 120-foot level. This ore had been left by the old company at that level. The yield of the same kind of ore at the time of the original operation of the mine was \$23 per ton, thus showing that by the new process of treating ores the yield had been more than doubled. There is upon the ground complete machinery for unwatering the mine and exploring it. Tools and all plant necessary are now owned by the company. The vein at the bottom of the shaft was well defined, large and apparently as good as at any time in the history of the mine. When we say "shaft" it should properly be called an incline, as the vertical depth of the opening is only about 350 or 400 feet. Miners in those argonaut days of quartz mining did not believe, as a rule, that pay chutes extended down to any great depth, but the history of the mines in this section shows that they have often proved unprofitable at a depth of 400 or 500 feet, and rich at lower levels. There has never been an assessment levied during all the time the mine has been worked. In addition to the current expenses of the operation, it paid a dividend of \$48,000, and its construction account was \$175,000, which may be regarded as an additional profit. It is proposed to unwater the mine, sink a shaft or incline to a depth of 300 feet more than at present, to explore the old workings.

PIONEER QUARTZ-MILL.—*Grass Valley Union*, Sept. 13: Wm. S. May, who has the contract for building the works on the Pioneer quartz mine, the property of James G. Fair and A. E. Davis, on Humbug canyon, Placer county, went over last evening to look after the work which has already been commenced, an advance party having preceded him. The heavy machinery will be sent from Colfax by way of Iowa Hill. The lumber for the mill will be furnished by the Sugar Pine mill, which is above Iowa Hill in the direction of Humbug canyon. Mr. May expects that it will take about 70 days from the present time to complete the mill and other work included in the contract. The foundations of the mill are now being excavated, and a tramway leading from the mine to the mill-site is well under way, under the direction of Mr. Everett, who has been on the ground for several weeks.

TUNNEL HILL.—*Herald*, Sept. 14: There is a ledge on Tunnel Hill, near the South Yuba canal, which is looking very promising. It is in slate formation and runs across the country rock, east and west. Palmer & Co. of Washington are sinking a shaft upon it for a share in the mine. They are getting very good prospects.

San Diego.

JULIAN MINES.—*Sentinel*, Sept. 14: About five miles from Julian are a group of mines owned by Messrs. Hamilton, Melrose and Feeler, which were discovered last spring. The formation of the country is granite and slate. The parties have two shafts down 40 feet, and on the Gold King mine the outlook is splendid, the rock being very rich, the owners mortgaging out good wages. Around this mine they picked up 20 tons of float rock, all showing free gold. The shaft shows a strong vein all the way down, and at the bottom the ledge is wider and very rich. They also have another mine called the Gold Queen, which looks fully as well as the Gold King. The Fraction mine, which is situated in the Banner district, is extracting very rich ore. The vein is from four to ten inches wide, and very rich in free gold. At present the Cincinnati mine is idle, owing to the bad air. The owner is trying to put up some apparatus to convey air through the mine. The Ready Relief mine is still pushing its lower level forward. They are now in 500 feet, and a good body of ore is in sight. When this level is in 350 feet further it will throw a body of ore overhead 100 feet high by 400 feet long; the level above this one was worked for 14 years, and paid several hundred thousand dollars. The Warlock mine is paying good wages to its owners. They have a good ledge in sight and will soon make big shipments of ore. The Ruby and Hidden Treasure mines are doing well.

RED HILL.—*Julian Sentinel*, Aug. 24: This mine is situated in the Mesa Grande district, and was discovered by Fred Scholder. The formation is red gouge and slate. On this hill and in this claim are hundreds of little strata running in different directions carrying gold paying from \$20 to \$300 per ton; the gulches running from the bill carry placer gold and were worked years ago. In working these gulches the parties were led to this red hill and they began to find float quartz; this caused an excitement which led to the sinking of shafts all over the hill. In most of these shafts strata would be struck which were immensely rich, but none of the parties were experienced in mining, so in a few years the mine became idle. In 1881 J. M. Farley and others purchased the mine, doing work enough each succeeding year to hold the assessments, and finally this year concluded to work the mine for all it was worth. After reviewing the ground they concluded to sink 100 feet and crosscut to find the main ledge. Upon sinking the shaft to a depth of 60 feet they struck a vein two feet wide which will average \$25 per ton, and the ore improves as they go down. The boys are elated and talking quartz-mill already. The outlook is certainly a splendid one and in the near future this will be a good mine, pouring out considerable bullion.

REDUCTION WORKS.—*National City Record*,

Aug. 30: The Reduction Works are forging right ahead and are beginning to attract much attention throughout the country. Communications are being received by Superintendent Chick from all sections concerning ore shipments and when the works will be ready to make contracts. Large quantities of ore are being brought to the city from the mines for mill tests, which are being made daily. One lot brought from a point not far from National City, ran \$120 to the ton, and was pronounced perfectly free-milling. Mrs. L. De Garfias showed some very rich quartz in National this week. It was taken from a claim which she owns about 15 miles below the line.

Shasta.

IMPORTANT SALE.—*Shasta Courier*, Sept. 15: The group of mines on Dog Creek, near Delta, in which Wm. M. Murray was part owner, has been sold to Whitacre Wright of Philadelphia, for \$36,000. As to the richness of these ledges, there is no doubt.

NIAGARA MILL.—James Southerland, superintendent of the Niagara mill and mines in French Gulch District, was in Shasta this week. The great works and mine plant under his supervision are in a flourishing and prosperous condition, and everything moves along with the precision of a clock.

Sierra.

THE MARGUERITE.—*Tribune*, Sept. 14: Work is progressing favorably at the Marguerite mine. Superintendent Morris has leased the old Dutch ditch with the privilege of buying it at a future time. This will always assure an abundance of water to run machinery with.

Trinity.

QUICKSILVER.—*Journal*, Sept. 15: Supervisor Vollmers of Trinity Center was in town the first of the week, and says a good deal of work is being done on the quicksilver mines near Cinnabar. The Altoona Company has 22 men at work and by spring will have over 100 men in their employ. Carpenters, miners, road-builders and brick-makers are all at work and the camp presents a lively appearance. A large supply of brick is being made for the construction of smelting furnaces. In sinking a shaft, double the quantity of ore in sight in any part of the mine was exposed. The ore is very rich, some of it yielding as high as 75 per cent in quicksilver. At present, work on the mine consists of retimbering old tunnels and running prospecting tunnels so as to get things into shape to work on a large scale. Mr. John Lytle, the original discoverer and locator of the Altoona, is the superintendent, having come up from Tulare county to take charge of the mine.

Tuolumne.

NOTES.—*Union-Democrat*, Sept. 15: Louis Blanding, the metallurgist, assayed some silver and gold ore this week from a lode about 40 miles from Sonora. It was rich in gold and silver, going far up into the hundreds of dollars. Messrs. Thos. Birney, Joseph Hudson, John O'Hara and Al. Harkness are working night and day on their Bald Mountain claim. Mr. Harvey Wood and son were in town Monday from Robinson's Ferry. He reports big improvements and extensive operations there consequent on the purchase of large mining interests by the English syndicate. Work was commenced on the Bonanza mine Tuesday. The present management intend to go down as far under the water as the gold goes, no matter how far that may be. To that end substantial improvements are now making in the mode of timbering and development. May the "old Bonanza" always have roots.

THE BALTIC.—*Tuolumne Independent*, Sept. 15: The Baltic mine, the property of Louis Page and Dave Oliver, is being pushed rapidly forward. They depend on the Tuolumne Co. water ditch for necessary power to work the machinery, and through its giving away twice, they have had their pump stop and the mine fill up with water as many times. The shaft is now down about 125 feet below the creek or water level; a cut has been made 325 feet in length and continued by a tunnel running some 650 feet more.

Ventura.

BITUMINOUS ROCK.—*Free Press*, Sept. 7: Tests are constantly being made with the bituminous rock found near here, with the most satisfactory results. There is now little doubt that it is the best quality yet discovered on the coast. If it exists in sufficient quantity to warrant the building of a railroad track to it, it will prove of more value than a gold mine to the owners and the community.

NEVADA.

Washoe District.

HALE & NORCROSS.—*Enterprise*, Sept. 15: Since last report we have received complete returns from the United States Mint of the bullion from 2615 tons of ore worked at the Nevada mill last month. Gross yield, \$87,142.52; gold, \$44,310.96; silver, \$42,841.56. On the 500 level the main west drift has been advanced 35 feet and the south drift 28 feet. The south upraise above the 600 level is advanced 70 feet, and the north upraise the same distance. We have completed the new working station from the 800 level of the vertical shaft and have started a drift west therefrom.

GOULD & CURRY.—The El Dorado level east crosscut from main south drift has been extended 21 feet; total, 56. Formation, low-grade ore. The north drift started from west crosscut No. 2 has been extended 25 feet; total, 45. Upraise 45 feet south of crosscut No. 2 has been carried up eight feet; total 100. East crosscut from top of this raise has been advanced eight feet. Formation, porphyry. The drain tunnel level south drift started from east crosscut No. 2 has been extended 27 feet; total, 39. Face in good milling ore.

CON. CAL. & VIRGINIA.—On the 1300 level have completed the work of retimbering the main south lateral drift. On the 1435 level the east crosscut started from south lateral drift No. 2 at a point 70 feet south of west crosscut No. 1, has been extended 16 feet; total, 46. This crosscut is still in porphyry, with quartz carrying some value. Have continued to extract the usual quantity of ore from the stope east of the winze below this level. On the 1500 level the parallel north has been extended 18 feet; total length north from east crosscut No. 1, 148 feet. Have continued to extract ore from the southeast drift which runs from the upraise above the parallel north drift 53 feet above the track floor of

this level. On the 1600 level continue to extract ore from the stope around upraises Nos. 1, 3 and 4, carried up from the face floor of this level; also, extracting ore from the drift running south from the Ophir line, 56 feet above the track floor of this level. On the 1650 level, the upraise from the drift running south from the east drift from the Con. Va. shaft has been carried up 21 feet; total, 66. Are continuing to stope out ore at the end of the south drift.

BELCHER.—The 500 crosscut is now in 212 feet and shows no change since last report. Have repaired and rest the incline sheave since last reported and repaired and retimbered the station. Will start a drift north from the shaft this week on the 200 level to connect with the Crown Point south drift, 160 level, which is extended to our north line. The Suro tunnel drift is out 700 feet.

SAVAGE.—On the 300 level the south drift has been advanced 32 feet, and continues in fair-grade ore. The car samples average \$28 per ton. We have resumed work in the face of the southeast drift on the 400 level. We have men on repairs, easing timbers and prospecting the several levels of the mine.

BEST & BELCHER.—West crosscut No. 1 from main northwest drift has been extended 29 feet, total, 145. Formation, quartz giving low assays. The main northwest drift has been extended 39 feet; total, 51. Formation, porphyry and quartz.

CROWN POINT.—Started No. 1 crosscut west from the 700 south drift during the week and advanced it 30 feet. The face shows bunches of quartz, but is principally clay. Expect to strike the ledge in a few feet. The Suro drift is out 700 feet.

ALPHA AND EXCHEQUER.—The east crosscut on the 382 level of Exchequer is in 90 feet. The face is in clay and porphyry. The east drift in Alpha is in from the old shaft 95 feet, the last 8 or 10 feet showing fair ore.

WEST YELLOW JACKET.—Made connections with incline and struck a body of low-grade ore, about \$20 rock. There is a very rich seam in the body. Will run the drift about 20 feet before opening up.

SIERRA NEVADA.—On the 520 level, east crosscut No. 2 from the main south drift has been extended 54 feet; total, 304. This crosscut is still in a porphyry formation, carrying some quartz.

OPHIR.—On the 1465 level the old east drift from the shaft station has been extended 39 feet; total distance reopened and retimbered, 204 feet. Have completed the repairs to the shaft station.

YELLOW JACKET.—Surface repairs are progressing satisfactorily. The foundation to the machinery was found in a much worse condition than was expected, but a substantial job is being done.

OCCIDENTAL.—On the 48 and 100 levels are stopping ore. Have extracted 144 tons of ore and shipped to the Atlanta mill 150 tons. Value of wagon samples \$29.50 per ton.

UNION CON.—The joint Union and Mexican north drift, started from the east drift from the Ophir shaft on the 1465 level, has been extended 60 feet; total, 248.

CHOLLAR.—The work during the week has been confined to repairs on the different levels. Have opened a new station on the 750 level, which is timbered in 26 feet.

CONFIDENCE.—Necessary repairs to different portions of the mine, which could not be conveniently done while ore was being extracted, are now being carried out.

MEXICAN.—The joint Mexican and Union shaft drift, started from the east drift from the Ophir shaft on the 1465 level, has been extended 78 feet; total, 188.

ANDES.—Will commence to retimber the shaft next week. It is much out of repair. Are crosscutting on the 240 level and drifting on the 350 level.

KEYES.—Patrick Keyes reappointed superintendent in full charge, and all others bounced. Work will be vigorously prosecuted in the mine.

UTAH.—On the 472 level the east crosscut has been extended 45 feet; total, 140. The formation is porphyry showing some water.

ALTA.—Usual work being done and extracting and concentrating the usual quantity of ore from the 825 and the 1150 levels.

SCORPION.—South drift on 500 level extended about 15 feet during the week. No change in the ground to report.

JUSTICE.—Usual operations going on. The work of putting up the new mill is prosecuted vigorously.

POTOSI.—The south drift on the 650 level is in 384 feet—all in quartz giving low assays.

BALTIMORE.—The work is progressing satisfactorily on the 382 level.

BULLION.—The usual work only is reported this week.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, Sept. 14: Repairs on the shaft are now finished and water being hoisted day and night.

COMMONWEALTH.—100-foot level: No. 2 south drift has reached the south-end line, and joint crosscut started west to intersect the upraise from 150-foot level. The crosscut has been advanced 31 feet, cutting some very fine ore, assaying \$190 per ton. In the north intermediate drift have been putting in timbers. The ore being exposed is as high grade as any ever extracted from the mine. 150-foot level: No. 3 north drift from east crosscut has been advanced 18 feet. No. 1 north drift from No. 1 west crosscut has been extended 12 feet, without any particular change. No. 2 winze from east lateral drift has been sunk 11 feet, showing good ore in the bottom. The south drift from 225-foot level has been extended 22 feet, cutting some very fine ore. The course of the vein is very near the same as the drift, so the drift will penetrate farther in as it advances. Assays show from \$33 to \$291 per ton.

NORTH BELLE ISLE.—East crosscut No. 2 north, 300-foot level, extended five feet in very hard rock. Joint upraise from the 400-foot level extended 22 feet. The high-grade ore has continued in good width the whole distance from the 400 level. The stope on the 300 have yielded their usual quantity of high-grade ore.

NEVADA QUEEN.—Joint crosscut from Commonwealth south drift, 100-foot level, has been advanced 31 feet. The face is all in ore assaying from \$30 to

\$450 per ton. This crosscut is being run to connect with the upraise from 150-foot level. The upraise had fine ore all the way up. The stopes have improved during the week; they yield a full supply for the mill. The upraise from 150-foot level has been extended up 22 feet, total 62 feet, carrying high-grade ore all the way.

NAVAJO.—The crosscut from the west vein, 350-foot level, has been extended six feet. The stopes on this level are looking well and are yielding some very high-grade ore. Some very fine ore is also being taken from the intermediate level.

FOUND TREASURE.—Southeast drift on southwest vein, 150-foot level, has been extended 10 feet. Crosscuts will be run in both directions from near the face of the drift. Southeast drift, 200-foot level, has been extended 20 feet.

BELL ISLE.—Crosscut from the north drift, 250-foot level, extended 12 feet. The stopes have yielded some high-grade ore.

DEL MONTE.—The combination shaft has been sunk and timbered nine feet. The rock in the bottom is quite hard.

NORTH COMMONWEALTH.—The combination shaft has been sunk and timbered nine feet; rock pretty hard.

ALASKA.

MINING ON THE YUKON.—Alaska Times, Sept. 10: A part of an interview with Mr. D. H. McNeill, one of the party who left with William Ogilvie to survey the northern country on behalf of the Dominion Government, says that mining carried on along the Yukon is done in this wise: The river freezes to a great depth, and on the banks and bars the ice is generally solid to the bottom. The miners cut away the ice and then dig up the gravel, which is also frozen, and carry it on the banks. This process is continued till the river breaks up for a couple of months, when the dirt is carried back again and washed for gold. In this way, says the informant, one man took out \$1000; but it is hard work. The gold is principally coarse, the largest nugget being valued at \$40. This nugget, it may be stated, was lost. The owner being drowned a short time after he found it. His name was Michael Sufferin, a native of New Brunswick or Ontario. Mr. McNeill has samples of the Yukon gold with him. Provisions are pretty dear. Flour is \$17.50 per 100 pounds; bacon, 40 cents per pound; beans, 30 cents; sugar, 30 cents; dried apples, 30 cents, of all of which there is a fair supply. During the winter there were 36 cases of scurvy among the miners, and three deaths occurred. The Indians on the Yukon are peaceable and willing to work.

ARIZONA.

THE OLD DOMINION COPPER COMPANY.—Silver State, Sept. 8: On Tuesday we availed ourselves of the invitation of Supt. A. L. Walker of the Old Dominion Copper Company, to inspect the company's mine, the Old Globe. Probably what impressed us most forcibly during our tour of the underground workings, after an interval of more than two months since our last visit, was the great change wrought in the appearance of the stopes, drifts and crosscuts. A copper furnace is a veritable gormand in its consumption of ore, and the daily output from a mine in constant operation very soon renders the ore bodies unrecognizable to a person who is only an occasional visitor. We believe we are within bounds in stating that the result of the present season's operations thus far, both in output and financial returns to the company, was never equaled in the history of the property, considering that, with the exception of a short period, only one furnace has been in blast, and a great amount of deadwork has been done. In fact the development work now in hand is the most important undertaken for years, and as it has progressed ore bodies have been encountered which, while not a surprise to the management, yet in extent, and the character and quality of the ore, are fully realizing all expectations. Work on the drift in the fifth level, to connect the present works with the new double compartment (Interloper) shaft, was discontinued some weeks ago to avoid a flow of water from the mine into the new shaft, which would interfere with sinking. However, this drift and the corresponding one on the fourth level will soon be driven to completion, as the shaft is down as deep as is desired for the present. With these connections made, most of the ore will be raised through the new shaft, which will make a material saving in the handling of ore, the greater part of which is now discharged through the Moony incline shaft and the first level tunnel, not without considerable labor. The new shaft is down about 310 feet, or below what will be the sixth-level station, and it will be sunk no further for the present. It is the intention of Superintendent Walker to soon begin the opening of a sixth level. In the drifts on the fourth and fifth levels before mentioned, fine ore was encountered, and the same character of ore was found also in the Interloper shaft, thus proving beyond a doubt the existence of a continuous ore body, the extent of which, while not yet accurately determined, is known to be large. In the drift on the fifth level, about 150 feet from the new shaft, a crosscut was started, and 25 feet is in good ore, which is widening out as work progresses. In the old workings, on almost every level, more or less ore is being extracted, but chiefly on the first, second and fifth levels, where the showing is excellent.

COLORADO.

NOTES.—Elk Mountain Pilot, Sept. 13: The Norman lode near Elko is developing into a good mine, the ore is galena with some copper pyrites. Mr. A. B. Williamson shipped his first carload of ore this week from the Pennsylvania tunnel. It went to the Pueblo sampling works. Mr. Baxter is working the Excelsior mine in Poverty gulch. He is driving the tunnel ahead on the vein. The Tabor mine has shipped two or three carloads of ore from here to Denver.

DAKOTA.

ELK MOUNTAIN.—Deadwood Pioneer, Sept. 9: The Elk Mountain Company is at present receiving bids for a contract to extend their present tunnel on the Comstock 50 feet.

FLOAT.—The battery for the Homestake steam stamp passed through the city last evening loaded

on two wagons and drawn by 13 yoke of oxen. Considerable activity is noticeable in what is known as Kintabaga gulch, and mine-holders in that vicinity are said to be meeting with very encouraging results. Corncock stockholders are jubilant over recent developments of the property. Recent advices from the Fremont state that work has been suspended for a short period on this property on account of the illness of one of the owners, it requiring the assistance of all in the further sinking of the shaft, which is now down about 50 feet. Directors of the Desire Mining Company held a meeting yesterday, at which an assessment of one-quarter of a cent was levied. Work is being vigorously prosecuted on the Big Owl and several other claims in that vicinity. When Dan Brown left Galena with the express yesterday morning, the Merritt smelter had turned out some 84 bars of bullion. The plant had then been in operation three and one-half days. Among many other properties rapidly coming to the front may be mentioned the Gold Hill. This property is located on the west side of Portland, and is one of the best developed properties in that vicinity. The last work done by the owners consisted of driving a 30-foot tunnel, in the face of which appears a 2-foot vein of ore of a very rich nature.

IDAHO.

SILVER FORTUNE GROUP.—Wood River Times, Sept. 12: The following is from an interview with Mr. McLeod, foreman of the above mine: The Silver Fortune, Oregonian, Snowdell and P K are four as good prospects for big mines as can be seen on Wood River. The four claims run end to end, and we have traced the length nearly the full length of 6000 feet, or for over a mile. We struck ore in every place where we did work, and I would not be surprised if we had an ore-chute over a mile long. If that is not the longest continuous argentiferous galena ore-chute in the world, I am much mistaken. We first got ore in the Silver Fortune, where we sunk a shaft 70 feet. That was the discovery. We traced the vein 600 feet from the discovery, made an open cut there, cut the vein, and found a nice showing of ore. On the Oregonian, which adjoins the Silver Fortune, we sunk a shaft 70 feet, found ore all the way down, traced the vein as far as we went, run two open cuts, and found ore in both. On the Snowdell we traced the vein, ran an open cut, sank on the vein 40 feet, and found ore. On the P K we've done no work besides tracing the vein on the surface. I think that for the amount of work done this is the best showing ever seen anywhere. East Fork is going to be a bonanza camp, and a year or two hence will see the Wood River region as productive as Leadville ever was.

CEUR D'ALENE MINES.—Wardner News, Sept. 8: In the Yreka district work is progressing very rapidly on the Last Chance mine and a large quantity of good concentrating ore is being daily added to the vast amount at present on the dump. The upper tunnel is being extended and a large force of men is engaged in stoping at various points. On the first of the month the lower tunnel was in 238 feet, and an addition of five feet has since been daily added to its extent. The vein will be cut when a distance of 440 feet from the starting-point is attained. The machinery for the concentrating works of this company is all on the ground and is being put in place as rapidly as circumstances will permit.

LALANDE DISTRICT.—The Gem group of mines are winning new honors for the productive regions of Canyon creek and are coming to the front as first-class ore-producers. The Milwaukee Mining Co. was so well pleased with the recent developments, they made the final payment on the property a few days ago and took up the bond ten days prior to its expiration. J. J. Smith, manager, has put on an extra force of men and is pushing work with great vigor. In the lower tunnel, which is in 270 feet, a body of six feet high-grade galena is visible. The company is now shipping enough ore to pay all running expenses. A water ditch is being constructed from Bell creek a distance of 1700 feet with a fall of 237 feet, and all arrangements have been made for the immediate erection of a concentrating-mill with a capacity of 40 tons per day. A. M. Esler has obtained an extension of 60 days on his bond on the Bell group of mines on Canyon creek and has recommenced work on the property.

EVOLUTION DISTRICT.—A number of claims along the famous gray copper belt are being developed to great advantage; every gulch boasts of its prominent mines, and every mine on which any amount of work is being done, promises bright rewards to their owners. The West Point group on Rosebud gulch is looking better than ever. In the upper workings on the Nellie lode, Messrs. Horton & Alger are sinking on a chute of ore from which assays have been obtained ranging all the way from 100 to 4000 ounces per ton. They have from 4 to 15 inches of this class of ore and are preparing to ship a carload of it to the works at Omaha.

EAGLE DISTRICT.—A. J. Prichard has a force of men working his placer claim on Tributary gulch at the headwaters of Eagle creek, near the town of Eagle. While in the city this week Mr. Prichard exhibited to a News reporter a number of coarse nuggets worth \$125, which were taken from his claim; they are fine specimens of gulch gold and a good indication of what his ground contains.

NOTES.—The supply of water in Prichard creek proving rather scant at present, the Mother Lode astrakha can only run about half the time, while the Treasure Box astrakha on the ground adjoining has been obliged to suspend operations. Martin Curran, superintendent of the Morning lode on Chloride Hill, reports a big strike of ore being made this week.

MONTANA.

PEARL.—Inter-Mountain, Sept. 14: J. K. Pardee, who is over from Phillipsburg, reports sinking on the Pearl going on steadily.

COMBINATION.—A diamond drill has been purchased for the purpose of thoroughly exploring the property in advance, that they may sooner arrive at a conclusion relative to increasing their mill capacity by adding 10 stamps.

RUBY.—The syndicate which had a bond upon the Ruby mine in the Lowlands, having given it up, the owners now intend to work the property. They say they have \$150,000 worth of ore in sight and are not at all in doubt as to having a big thing. The

only ore we believe that was ever shipped from the property was some 12 tons last winter, which was taken to the sampling works and netted them something like \$2000.

VOLUNTEER.—The directors of the Volunteer yesterday ordered work to commence at once in sinking the shaft 100 feet deeper, giving a total depth of 300 feet. This work will require about 40 days for its completion, it is expected. The ore in the face of the west drift is about the same in width as at last report—three or four feet. There is a streak in this about 10 inches wide which runs from 30 to 60 ounces. The remainder is a little above 20 ounces.

NOTES.—Boulder Age, Sept. 12: The Amazon smelter resumed work last week with a small force of men. J. F. Smith, who owns the Josephine mine near the head of Galena gulch, has bonded that property to Butte parties for \$20,000. The concentrator at the Evening Star mine is moving along steadily. The machinery is being hauled to the ground and the work of putting it in place begins this week. Uncle Ben Mason has had men at work on the Virginia Bell and its extension for some time, and Monday they struck a fine body of ore just where the two claims join. Tom Harper is pushing the development work on his properties, the Buckeye and Boston lodes, in the Cataract district, and is determined to see what is in them. He has shafts down 20, 25 and 45 feet, and has a force of men constantly at work sinking deeper. Mr. George Spencer is working on his mine, the Wilbur, three or four miles north of Boulder, and has a very promising outlook. He is down about 50 feet and is getting out a considerable amount of fine-looking galena and carbonate ore which will certainly pay.

NEW MEXICO.

FLEMING.—Southwest Sentinel, Sept. 11: The concentrators on the Pauline report the late strike as improving in quality and quantity as depth is gained.

BULLARD'S PEAK.—Mr. Milton Miller reports a new strike on the Alhambra, made on the second level, 200 feet from the main shaft. The ore is of the same character as that formerly shipped from this mine, which yielded from \$1500 to \$8000 per ton in silver.

CHLORIDE.—The carbonate in Chloride Flat is meeting with the expectations of the most sanguine of its owners. A new strike has been made against the porphyry dyke. As yet the extent of the strike is not known, but indications lead to the belief that it will, on development, prove to be of no slight importance.

PIÑOS ALTOS.—The Mountain Key mill is running nights, days and Sundays on ores from the "Key," and has at present a bountiful supply of water. Work is soon to be resumed on the Night Bird. The ore is free-milling. The mines throughout the district are looking well, and the amount of ore on the dumps awaiting treatment closely approximates 2000 tons. The Smith & Ailman five stamps are on full time, and are running principally on custom ore. The Deep Down, near the head of the Atlantic gulch, is rapidly winning a front place as the model mill of the Southwest. The El Dorado group, under the management of Osborne & Co., is one of the steady, never-varying producers of the camp. The labor of three men yields at the rate of 18 tons per month, and the value of the product is a trifle less than \$60 per ton. The Thunderbolt at 55 feet is improving as depth is gained, and it is not at all improbable that this little venture of the Carter boys will net them handsome returns on their investment. The Wagner mill is pounding day and night on ores from the celebrated Atlantic, and hence "Peter the irrepressible" is happy, inasmuch as the yield per ton closely approximates two ounces, which, together with the concentrates, makes a round value of \$60 per ton. The Golden Crown is on the southwest slope of Whisky creek. The shaft is now 90 feet in depth, and copper pyrites is rapidly displacing the zinc, oxides and blends, so common near the surface. The ore assays well and the crevice, as now exposed, indicates great strength and continuity. The Mohawk, under the management of Erich, Haskell & Co., is producing a fine quantity of ore. The arastras will soon be started up, and the product of the mine will be reduced by this primitive method, owing to the fact that the mills are crowded to their full capacity with custom ores. The mills are running on full time, and as we go to press 45 of the 50 stamps are running night and day. The present week Bell & Stevens are running ten stamps on ores from the Golden Giant, now among the most prominent mines by reason of its productiveness, in the district. A big strike was made in the Pacific last week. A drift was run at a point 100 feet below the old workings, striking a vein between four and six feet wide. The ore assays \$40 to \$45 per ton, but will certainly run at least \$25 per ton. A large chunk, weighing about 1500 pounds, was brought to town and is on exhibition at the Tremont House.

OREGON.

OLD MONUMENTAL SOLD.—Bedrock Democrat, Sept. 10: The parties from London, Messrs. Mitchell and Bowick, the representatives of the syndicate upon whom devolved the examination of the property and to reject or approve the terms of sale, visited the Monumental mine and mill and returned to the city. Yesterday they were met in this city by Messrs. C. A. Alisky and C. S. Miller, and papers were made out by which the London Company, through their agents, Messrs. Mitchell and Bowick, became the owners of the property. The Monumental has had a history similar to many mining enterprises that have been inaugurated on the Pacific Coast. Discovered in 1873, the property was developed to some extent by parties who were lacking in means, but finally passed into the hands of Portland parties. A company was incorporated and development work pushed, and the prospects were so satisfactory that in the year 1875 a first-class milling plant of 20 stamps was erected. A merchandise store, boarding-house and other business houses were started at the mine, and for a year or so the camp had a genuine boom. Finally the collapse came for some reason and operations were entirely suspended. From that time until now the mine and mill have remained idle, and the owners have been hoping against hope for some good fortune to come to bring the enterprise to the front once more. The sale of the property at this time be-

tokens a renewal of operations on the Monumental on a more extensive scale than ever before attempted, and bids fair to create a new interest in the mines of that section of which there are numerous good-paying properties if properly handled. Messrs. Mitchell and Bowick yesterday made extensive purchases of supplies for the mine, and will in a day or so send out a force of miners to commence operations at once.

GRANITE CREEK.—Extract from a letter to the Pendleton Tribune. The writer has just returned from the Granite creek mines: "We were taken up almost to the top of the mountain to the richest mine of them all. It is called the Conqueror, and is the property of Backman & Cleaver. Rock ore is being taken out now that will mill not less than \$100, and as high as \$400 to \$500 per ton. This gold differs some from usually found in these regions; it is what they call 'Wire Gold,' a sample of which is in the possession of J. H. Robbins in the treasurer's office, also the rock from which it was taken. They can be seen at their mines, or the desired information can be gleaned from Mr. Robbins or C. J. Carlson in Pendleton, or corresponding with the owners of the mines. I am satisfied if a company with a capital of \$5000 to \$10,000 can be formed, these claims can be developed to an enormous extent. All of the mines, with the exception of the Conqueror, are low-grade ore, and with the cost of transporting the rock from the mine to the mill for reduction, with cost of milling added, and with the limited facilities and capital they have for carrying out this plan, the profits thereof are small, if any. The idea is to remove the engine from the mill and introduce a turbine water-wheel, thereby saving all of 50 per cent of the cost of reducing the ore and saving the gold also. The Conqueror was found after the afore-mentioned claims had been developed, without any flattering prospects, and is, without an exception, the richest in gold I ever saw. If Mr. Cleaver is correct, the Conqueror is the mother-lode of them all, and will one of these days be known all over the coast."

CRACKER CREEK.—Bedrock Democrat, Sept. 10: J. C. Young returned to the Cracker creek mines yesterday to resume operations on the Eagle mine. He took out with him a quantity of supplies sufficient to run his force for some time. Work will be pushed vigorously and it is expected that the owners will be enabled to commence shipping ore to Salt Lake for reduction in a couple of weeks. The ore already on the dump yields assays warranting transportation.

CRACKER CREEK MINES.—A correspondent of the Oregonian writing from the Cracker creek mines of Oregon says: The formation is principally of quartzite intersected with porphyry, with apparent surface condition favorable to rich and permanent ore deposits, and a thorough inspection of the Columbia and other mines now in process of development, but confirms former reports of the merits of this mineral region. Over the divide from Cracker creek lies the late discovered district of Rock creek, extension of the Cracker creek belt. In this most promising region, yet in its infancy of development, I visited a large number of prospects in process of development, among which one in particular, the Forest City, deserves special mention by reason of its rich and well defined showing and other characteristic features. The claim was discovered and located by J. P. Malarkey, and the manner in which it is being developed reflects credit upon that thorough and efficient mining man. The Forest City has two distinct and well-defined veins crossing at the surface with well-defined walls of quartzite and porphyry, and contain exceedingly rich ore, predominating in gold, of which an assay has been returned by J. F. Cresmon, assayer of Baker City, yielding \$10,729 per ton. A contract was let by Mr. Malarkey, and men are now at work in excavation, with the calculation of cutting the veins at a depth of 200 and 300 feet.

UTAH.

WOODSIDE.—Park Record, Sept. 15: A visit to the Woodside property where the leasers are working reveals a scene of considerable activity. The new find has been gone down on a distance of about 20 feet from the surface and a large area excavated for piling the ore on. The vein has widened out to about six feet, all in rich carbonates and chlorides. Indeed the vein looks better as depth is attained and the foot and hanging walls present every indication of permanency. The vein above and below the main workings has been stripped but very little yet, but there is ore in the grassroots all around. The excavations some distance above the discovery show the formation there to be somewhat broken up; that the vein pitches in an opposite direction to the mother vein, which is undoubtedly a true fissure one, as it runs east and west with a northwest dip like the great system of parallel veins in the district. This strike is a rich one and it is genuine. Assays of the ore run from 70 to 600 odd ounces silver to the ton, with a fair percentage of lead.

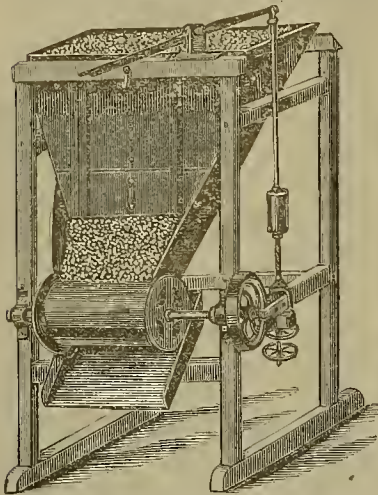
THE ONTARIO'S TUNNEL.—The Ontario's three-mile drain-tunnel from the east is in about 100 feet; so far the work having been done with hand-drills in hard rock. The fram-work of the large building, which will cover the boiler, compressor and other machinery, was raised Thursday, and the carpenters are rushing it to completion.

WASHINGTON.

FIRST ORE SHIPMENT.—Ellensburg Capital, Sept. 13: Sixteen thousand pounds of ore was recently shipped from the La Una mine at Conconully by T. L. Nixon, the owner, to San Francisco. He had extra heavy sacks made in order to retain the dust which shakes out of the ore so easily, and did everything to retain all the richest of the ore, but the parties who hauled it, instead of packing it in hay as directed, hauled it in open wagons and the sacks were worn full of holes by the time they reached the boat. When it was shipped at Ellensburg on the cars it had lost nearly a ton, and by the time it reached San Francisco it only weighed a little over 12,000 pounds, nearly two tons of the very richest of the dust having been lost through the holes in the sacks. The remainder, however, ran 138 ounces. Mr. Nixon had some of the dust similar to that lost assayed and it ran 589 ounces, and if the ore had been shipped without any loss it would have run about \$250 per ton. A fine showing for a new mine.

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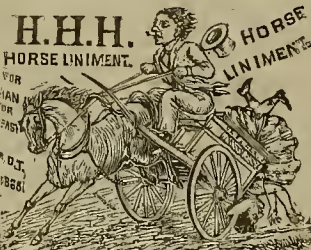
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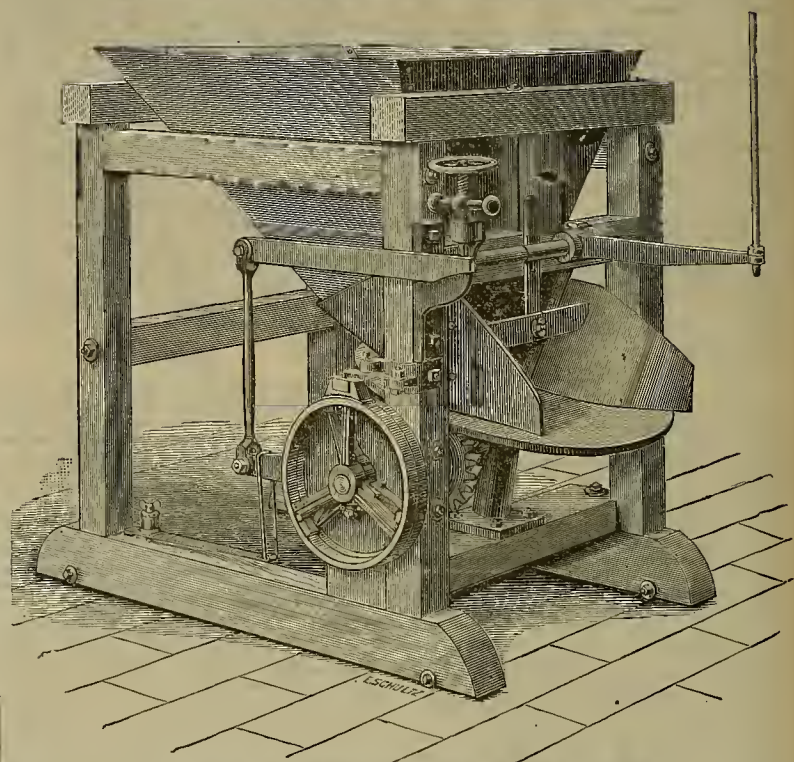
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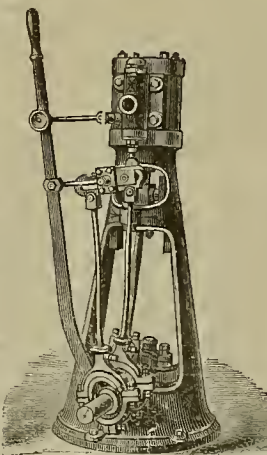
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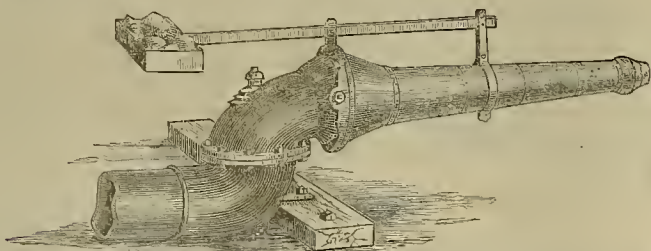
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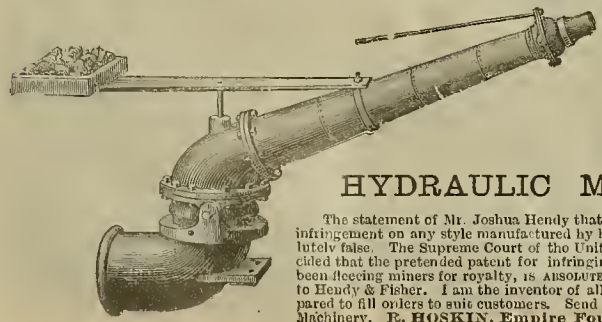
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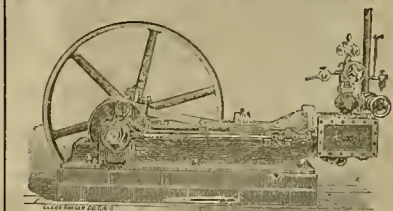
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These Wheels are designed for all purposes where limited quantities of water and
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Further information can be obtained of this form of construction, as well as the
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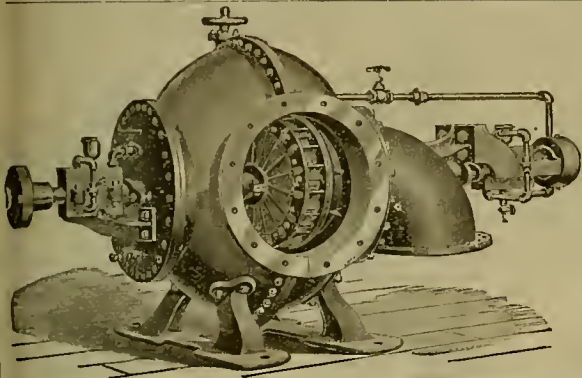
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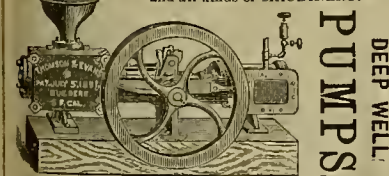
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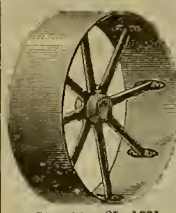
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Entirely new and original. Adapted to any power required. Time, trouble and money saved by using these pulleys.
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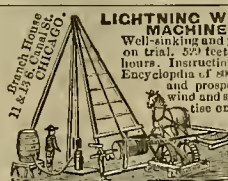
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Ores Received on Consignment, Sampled, Assayed, and Disposed
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Arizona's Fifth Industrial Exposition.

We are in receipt of a circular of the above-named exposition, from which we learn that the officers of the Fifth Annual Fair of the Arizona Industrial Exposition Association have determined to give greater prominence to the mineral department of the fair this year than ever before, and they invite every mining man in Arizona, whether owner or prospector, to units with them in getting up one of the best mineral exhibits that has ever been made on the Pacific Coast.

The premiums for minerals this year are nearly double those offered for the past three years; but mineral cabinets owned by citizens of Phoenix will not be allowed to compete for premiums this year.

All specimens sent for exhibition will be numbered properly to agree with a full description of the mine, setting forth the character of the ore, formation, development-work, averages assays, etc., which will be in a large book that will be open to inspection for all visitors. All valuable specimens will be safely kept in cases and receipts given for the same.

There will be a permanent exhibit hall in Phoenix, where mineral specimens as well as agricultural and horticultural products will be placed on exhibition. When this fair is closed all who are willing are invited to leave their mineral specimens for display in the permanent exhibit building.

Not simply the owners of developed and large mines, but all other owners, including prospectors and chloriders, are greatly interested in making a good mineral exhibit at this fair and permanent exhibit hall. If capital is attracted to our developed mines, our undeveloped properties will soon be sought after and sales secured of such as have merit.

Special efforts are being made to advertise the agricultural and horticultural resources of Arizona, hoping to induce capitalists to invest and immigrants to make their homes in this Territory. Thousands of strangers from the Eastern and Pacific Coast States will be present at the fair and during the winter months, as plans are now being perfected to secure two or three excursions from California during this fair, and several large excursions each month from the Eastern States.

Mr. G. W. Ingals, formerly agent of the MINING AND SCIENTIFIC PRESS in Arizona, is superintendent of the mining department of the exposition.

Wooden Pipe Manufacture in Olympia, W. T.

One of our correspondents was recently much interested in examining at Olympia, W. T., the process of manufacturing wooden pipe. It is one of few such institutions on this coast. It is known as the Puget Sound Pipe Co. The pipe is manufactured from logs approximating in diameter the size of pipe desired. These logs are turned down smooth and then bored out, after which they are covered with a coat of coal tar and are fitted to be fastened end to end with bands of iron. The advantages claimed for this kind of pipe are that it is better for cold countries, where water freezes and pipes break, a more inflexible style, and keeps cleaner than iron or terra-cotta, because there is no adhesion of deleterious matter to the inner surface. The factory employs about 10 men, and is now shipping pipe to Seattle, Sumner and Ellensburg, W. T., Arlington, Or., and great quantities to Salt Lake City, U. T., where it has been used for many years. At Palouse City, W. T., the pipe has been known to have been down for 22 years, and is still in good condition. O. Z. Mason is superintendent of the company manufacturing the pipe.

Allen & Harkness have one of the oldest established sawmills in the Territory at Olympia. It is not so extensive as some of the newer mills, but employs 10 to 12 men and turns out 10,000 feet of lumber per day.

The adjoining sash and door factory of Springer, Whits & Co. completes the list of factories of any note at Olympia. Here 12 to 15 men are given steady employment, while all of the proprietors are practical workmen and overseers.

THE U. S. Fish Commissioners, John G. Woodbury and Livingstone Stone, have decided to establish a fish hatchery at Sissions. It will be located about one mile from town and water is to be supplied from Big Spring creek.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING SEPTEMBER 11, 1888.

389,443.—SHIFTER FOR GANG EDGERS—F. W. Cook, S. F.
389,449.—DRILL AND DREDGE—E. Derbec, S. F.
389,215.—PADLOCK—J. Friedmann, S. F.
389,456.—ORE FEEDER—J. C. Gibson, S. F.
389,512.—VEHICLE SPRING—M. P. Holmes, S. F.
389,481.—CHAIR SEAT AND CUSHION—A. Morris, S. F.
389,410.—BOAT-DAVIT ATTACHMENT—C. F. Rodin, S. F.
389,345.—MUSIC RACK HOLDER—A. W. Utzinger, Astoria, Ogn.
389,347.—DRILL JAR REAMER—A. Walker, San Luis Obispo, Cal.
18,607.—DESIGN—M. S. McQuarrie, Paso Robles, Cal.
75,864.—TRADEMARK FOR FLOUR—D. McC. Gedge, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SHIFTER FOR GANG EDGERS.—Frederick W. Cook, S. F. No. 389,443. Dated Sept. 11, 1888. This invention, as its name implies, relates to a means for shifting or moving the saws of a gang edger on their shaft, in order to vary their position according to the work required. The invention consists in a shaft or rod passing through a bearing in the saw-collar and provided with a pinion on each end which engages a fixed rack on each side. The object of this construction is to move the saws by a connection with the hub or collar thereon, and to apply the power, to move them, to both ends of the adjusting shaft or rod, whereby the adjustment is effected easily and with precision.

BOAT-DAVIT ATTACHMENT.—Chas. F. Rodin, S. F., assignor of one half to P. C. Rice of Enreka, Cal. No. 389,410. Dated Sept. 11, 1888. The object of this invention is to provide such a davit attachment as will operate automatically, to instantly and simultaneously release both ends of the boat the moment either end finds support in the water. This is accomplished by a simple but ingenious arrangement of books and triggers, the triggers being connected so that when one is tripped, the other will be instantly released also. The tripping of either trigger is effected the moment that end of the boat finds support in the water, and is accomplished by means of a spring-actuated attachment with the hook which engages the trigger, and this attachment furthermore provides for drawing up the hook and tackle out of the way the moment the release is effected, so that there will be no danger of interference or catching of the hooks under the boat-rail and capsize her.

ORE FEEDER.—James C. Gibson, S. F. No. 389,456. Dated Sept. 11, 1888. This is an improved machine for feeding ore to crushing or stamp mills. Its essential parts are a hopper, an intermittently rotating hollow cone or cylinder receiving the ore from the hopper, and a spirally arranged or inclined scraper within the cone or cylinder. The cone or cylinder is given its motion by a suitable clutch mechanism operated by a system of levers set in operation by the stamp stem, or otherwise connected with the machine to which the ore is to be fed. The ore passes out from the throat of the hopper, into the upper and smaller end of the hollow cone or cylinder, the intermittent rotation of which carries it against the inclined scraper near its outer end, by which it is gradually worked out and discharged into the battery or crushing-mill. A peculiar adjustable spring holds the scraper while in position, while the whole machine is simple in its construction and effective in its operation.

STATION INDICATOR.—John Knight, S. F., assignor of one-half to the Pacific Indicator Company, same place. No. 388,980. Dated Sept. 4, 1888. This invention relates to that part of the indicating mechanism of this class that is commonly known as the "box." Station indicators are devices for automatically exhibiting the name of station or street to which the car is approaching so as to give notice to the passengers. The general mechanism is divided into two parts, viz., the box or device by which the names of the streets or stations are exhibited and the mechanism by which power is transmitted to the ribbon or endless belt in the box. The invention of Mr. Knight consists of an improvement in the box, the arrangement of the traveling indicating ribbon and the arrangement of the driving mechanism by which the ribbon is given motion. The ribbon winds in a tortuous course over an upper and a lower drum, and is driven by an independent roller which it almost completely encircles. This independent roller is the essence of the invention and provides for driving the ribbon independently of the main drums or rollers, so that it is kept taut in both directions.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Bullion M Co.	Nevada.	34.	50.	Aug 4.	Sept 7.	327 Pine St
Baker Divide M Co.	California.	16.	25.	Aug 13.	Sept 17.	330 Pine St
Belcher M Co.	Nevada.	36.	50.	Sept 18.	Oct 23.	327 Pine St
Champion M Co.	California.	31.	10.	Aug 8.	Sept 10.	522 Montgomery St
Chispen M & M Co.	Arizona.	26.	10.	Sept 1.	Oct 15.	628 Montgomery St
Exchequer M Co.	Nevada.	26.	21.	Sept 6.	Oct 10.	31. C. E. Elliott.
Golden Fleece G M Co.	California.	13.	4.00.	July 31.	Sept 8.	806 Market St
Gray Eagle M Co.	California.	9.	05.	Sept 4.	Oct 10.	327 Pine St
Gr Western Q M Co.	California.	2.	15.	Sept 18.	Oct 22.	328 Montgomery St
Keyes S M Co.	Nevada.	2.	50.	July 16.	Aug 23.	333 Montgomery St
Locomotive M Co.	Arizona.	3.	15.	Aug 21.	Sept 23.	309 Montgomery St
Lady Washington Con M Co.	Nevada.	7.	25.	Aug 21.	Sept 23.	309 Montgomery St
Live Oak D.itt M Co.	California.	10.	05.	Aug 21.	Sept 27.	328 Montgomery St
Lord of Lorn G & S M Co.	Nevada.	5.	10.	Sept 6.	Oct 12.	15 Fremont St
Moscow Gravel Co.	California.	42.	40.	July 31.	Sept 3.	339 Montgomery St
Mexican M Co.	Nevada.	36.	25.	Aug 9.	Sept 13.	309 Montgomery St
Navajo Queen M Co.	Nevada.	1.	20.	Aug 3.	Sept 5.	533 Kearny St
Ophir S M Co.	Nevada.	54.	50.	Sept 1.	Oct 4.	309 Montgomery St
Pondere M Co.	Nevada.	1.	05.	Aug 11.	Sept 11.	309 Montgomery St
Spring Valley G M Co.	California.	3.	10.	July 19.	Aug 25.	330 Sansome St
Savage M Co.	Nevada.	70.	50.	Aug 3.	Sept 5.	309 Montgomery St
Superior M Co.	New Mexico.	3.	15.	Aug 15.	Sept 15.	309 Montgomery St
Teirakoff G M & M Co.	California.	1.	02.	Sept 8.	Oct 8.	308 Pine St
Virginia Creek Hyd M Co.	California.	6.	06.	Aug 29.	Oct 29.	406 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alaska M Co.	Nevada.	A. Judson.	320 Sansome St.	Annual.	Sept 27
Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	Annual.	Sept 27
Golden Fleece G M Co.	California.	J. J. Gleason.	Phelan Building.	Annual.	Sept 27
Lone Jack M Co.	California.	J. J. Seville.	309 Montgomery St.	Special.	Sept 29
Trinity G M Co.	California.	L. Wadham.	504 Kearny St.	Special.	Sept 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Sept 11
Confidence S M Co.	Nevada.	A. S. Groth.	515 Pine St.	1.00.	Aug 6
Eureka Con M Co.	Nevada.	H. R. P. Hutton.	306 Pine St.	25.	July 9
M. D. Dinlo M & M Co.	Nevada.	R. W. Heath.	310 Pine St.	25.	Aug 27
North Belle Isle M Co.	Nevada.	J. W. Pew.	310 Pine St.	10.	May 7
North Star M Co.	California.	D. A. Jennings.	401 California St.	50.	July 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50.	Aug 8
Idaho M Co.	California.	J. J. Gleason.	Grass Valley.	50.	July 11
Pacific Irons, Salt & Soda Co.	California.	A. J. Leigh.	230 Montgomery St.	1.00.	July 11
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	05.	June 12

San Francisco Metal Market.

WHOLESALE.	THURSDAY, Sept. 20, 1888.
ANTIMONY—French Star.	13 @ 14
BORAX—Refined.	7 @ 7
Concentrated.	6 @ 6
COPPER—	
Bolt.	26 @ 27
Sheeting.	25 @ 26
Ingots.	16 @ 16
Fire Box Sheets.	— @ 26
IRON—Glengarnock ton.	— @ 28 50
Eglington, ton.	— @ 27 00
American Soft, No. 1, 60 lb.	— @ 27 00
Oregon Pig Iron.	21 @ 23 00
Clay Lane White.	— @ 24 50
Shot, No. 1.	23 @ 23 00
Bar Iron (base price) 10 lb.	50 @ 52 50
Lead—Fig.	5 @ 52 50
Sheet.	8 @ 8
Pipe.	7 @ 7
Shot, discount 10% on 500 bag.	Drop, 15 @ 15
Black, bag.	15 @ 15
STEEL—English, lb.	16 @ 20
Black Diamond tool.	10 @ 16
Pick and Hammer.	8 @ 10
Flask, new.	4 @ 4
Toe Chisel.	4 @ 4
TIN PLATE—Coke.	5 75 @ 6 50
Charcoal.	6 75 @ 7 00
QUICKSILVER—By the flask.	1 05 @ 1
Flasks, new.	85 @ 85
Flasks, old.	85 @ 85

New York Metal Market.

Telegraphic advices dated Sept. 19th give the following New York prices:
BAR SILVER—90½c per oz.
BORAX—9c.
COPPER—LARK—Strong, but no business, \$17.65.
IRON—No. 1, \$22.00.
LEAD—Firm, 4mc tie \$4.47.
TIN—Easier and dull at \$23.25.
The following are the latest by mail from the "New York Metal Exchange Market Report":
COPPER—Firm, but very dull, spot closing at \$17.05.
TRANSFERABLE NOTICES (Lake) issued at — @ —.
LEAD—Active and unsettled at \$4.95 @ —, spot. Transferable Notices issued at \$ — @ —.
TIN—Irregular and active at \$22.20 @ 23.00.
Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, are as follows:
Buyers' and sellers' views. All prompt delivery. Australian Tin, — @ —; Billiton Tin, — @ —; Banca Tin, — @ —; Baltimore Copper, \$16.05 @ —; Orford Copper, \$16.00 @ 16.25; P. S. C. Copper, — @ —; Foreign Lead, \$5.00 @ 5.25; Foreign Spelter, \$5.40 @ 5.50; Antimony, \$9.75 @ 13.50.

P. AND B. PAINTS AND COMPOUNDS.—Among our new advertisements to-day will be found the card of the Paraffine Paint Company, which manufactures a line of paints, roofing and other material. The paint manufactured by this company is largely used for iron work and roofing, and is especially valuable for wood or iron which is exposed to acid fumes of any kind. It is also used for waterproofing cloth, paper, or leather. Boards or timber of any kind exposed constantly to water or alternating wet and dry are preserved by this paint almost indefinitely. See advertisement.

NATIONAL IRON WORKS.—We are glad to learn that the proprietors of these works, Messrs. Marchultz & Cantrell, are busily engaged on plans for a new and substantial brick machine-shop and foundry to be erected on the site of their old works. Meanwhile they have secured temporary quarters at 13 and 15 Spear street, where they will execute orders with their usual promptness.

THE loss by the late flood in Georgia is estimated at \$1,000,000. No estimate can be made of the damage to farms and crops from Augusta to Savannah, while the country along the river is submerged. Eleven persons have been drowned.

CAPTAINS of steamers plying to the Cascades report tremendous forest fires raging in the mountains on both sides of the Columbia river.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Aug. 30.	WEEK ENDING Sept. 6.	WEEK ENDING Sept. 13.	WEEK ENDING Sept. 20.
Alpha.	1.35	1.50	1.30	1.45
Alta.	1.50	1.75	1.40	1.50
Andes.	.85	1.05	.90	1.00
Argenta.	.10	.15	.10	.10
Best & Belcher.	2.90	3.40	3.00	3.15
Bullion.	.55	.60	.55	.55
Baltimore.	.80	.70	.65	.65
Bodie.	1.40	1.55	1.45	1.45
Benton.	2.00	2.15	2.00	2.00
Bodie Tunnel.	.60	.70	.65	.65
Bowling.	.60	.70	.65	.65
Central.	.30	.35	.30	.30
Challenge.	3.30	3.65	3.25	3.75
Champion.	2.40	2.85	2.40	2.65
Obollar.	3.75	4.00	3.75	4.00
Confidence.	.75	1.00	.75	.75
Independence.	.30	.35	.30	.30
Caledonia.	.35	.35	.35	.35
Con. Pacific.	.35	.35	.35	.35
Crown Point.	3.40	3.75	3.55	3.75
Exchequer.	.65	.70	.65	.65
Central.	.30	.35	.30	.30
Dudley.	.30	.35	.30	.30
East B. & B.	.30	.35	.30	.30
Eureka Con.	1.00	1.25	.85	.85
Grand Prize.	1.00	1.25	.85	.85
Gould & Curry.	2.40	2.90	2.40	2.65
Hale & Norcross.	4.30	4.75	4.40	4.55
Holmes.	.30	.35	.30	.30
Iowa.	.30	.35	.30	.30
Julia.	.30	.35	.30	.30
Justice.	.35	1.00	.85	.85
Kentuck.	.25	.30	.25	.25
Lady Wash.	.25	.30	.25	.25
Martin White.	1.00	1.15	1.00	1.00
Mono.	2.80	3.40	2.95	3.10
Mexican.	1.00	1.15	1.00	1.00
Mt. Diabolo.	1.30	1.50	1.30	1.30
Northern Belle.	1.50	1.55	1.40	1.50
Navajo.	2.60	2.80	2.45	2.50
North Belle Isle.	2.60	2.80	2.45	2.50
Niagara.	4.25	4.55	4.25	4.50
Nor. Queen.	1.10	1.20	1.10	1.10
Occidental.	1.10	1.20	1.10	1.10
Ophir.	5.25	6.15	5.75	6.00
Overman.	1.30	1.50	1.30	1.30
Potosi.	2.35	2.60	2.35	2.55
Peerless.	1.20	1.30	1.20	1.20
Peru.	.40	.40	.50	.50
P. Sheridan.	.20	.25	.20	.20
Sage Star.	2.05	2.15	2.10	2.15
Sage.	2.55	2.85	2.75	2.90
S. B. & M.	2.80	3.00	2.80	3.00
Sierra Nevada.	3.00	3.20	3.00	3.20
Silver Hill.	.50	.55	.50	.55
Silver Queen.	.55	.60	.55	.60
Scorpion.	.55	.60	.55	.60
Syndicate.	.10	.15	.10	.10
Union Con.	2.80	3.00	2.80	3.00
Utah.	1.10	1.25	1.10	1.25
Yellow Jacket.	3.25	3.75	3.05	3.40

Sales at San Francisco Stock Exchange.

WEDNESDAY Sept. 19.		200 Grand Prize.....	60c
300	Alta.....	50 Hale & Nor.....	4.45
100	Andes.....	50 Mexican.....	3.50
200	Alpha.....	100 Mono.....	1.25
545	Belcher.....	150 N. Belle Is.....	2.75
150	B. & Belcher.....	200 Navajo.....	1.50
100	Bullion.....	100 Overman.....	1.45
340	Baltimore.....	250 Ophir.....	5.75
20	Benton.....	50 Occidental Con.....	1.40
100	Belle Isle.....	150 Potosi.....	2.60
50	Chollar.....	300 Peerless.....	1.65
50	Con Va. & Cal.....	240 Savage.....	2.40
400	Crown Point.....	350 S. B. & M.....	3.65
10	Confidence.....	50 Silver Hill.....	.60c
450	Challenge.....	400 Sierra Nevada.....	3.15
350	Crocker.....	100 Utah.....	1.25
400	Con. Imperial.....	400 Union.....	3.20
400	Exchequer.....	50 W. Comstock.....	7.00
100	Gould & Curry.....	50 Yellow Jacket.....	4.65

Mining Share Market.

Of the mining share market not much can be said other than has in this column been said over and over during the past six months. Nothing can be more monotonous than the proceeding had in the Stock Exchange as repeated day after day. The dullness has become chronic—has etaying qualities not expected of it. What this condition of things denotes, if it presage anything special, no one can tell or even guess. All are at sea, some predicting better times at hand, while more despair of any early improvement in the market.

A Zinc Mine in Nevada.

We have reports of what is thought to be a very valuable deposit of zinc in the State of Nevada, located at a point about 22 miles north of Eureka, on the line of the Eureka & Palisade railroad. The area which is covered by the deposit, so far as explored, is said to be 1500 feet in length by 100 in width. The Examiner of this city gives the following particulars as reported by Ex-Congressman Wren of Nevada:

The earth is perfectly impregnated with it, and in one instance where a tunnel was cut 60 feet, finding the deposit everywhere, the roof of the tunnel shone like a palace of crystal from the sulphate oozing and forming stalactites.

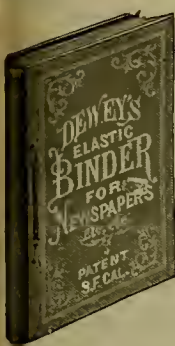
Beside the zinc there seem also to be deposits of gold, silver and lead; but the zinc is by far the most important discovery, if it can be turned out as it is believed it can be.

The main idea of the people there is to manufacture zinc-white, which is worth about \$250 a ton. The great difficulty which this manufacture has encountered is the high price of the carbonate of soda which is necessary in its manufacture.

It so happens in this case that Nature has treated the district with as much favor as she did the silver districts when salt deposits were found near them. All around the zinc district are immense deposits of carbonate of soda that can be taken for next to nothing in cost.

Carbonate of soda will precipitate sulphate of zinc from its solution, and from this zinc-white is manufactured. Heretofore this costly preparation came solely from France.

Should it so occur that something unexpected would turn up and prevent the white-zinc manufacture, the sulphate of zinc itself remains and is of greater value than many would estimate for medicinal purposes. As it stands now, the druggists of the world must make their own sulphate of zinc, and they are obliged to depend on pure metallic zinc at the rate of ten cents a pound for their manufacture.



A NEW PAPER BINDER—A. T. Dewey's patent elastic binder, for periodicals, music and other printed sheets, is the bandiest, and very cheapest of all economical and practical file binders. Newspapers are quickly placed in it (as received) and held neatly, as in a cloth-bound book. It is durable, and so simple a child can use it. Price (size of this paper, Harper's Weekly, and Scientific American), 75 cents; postage 10 cents. Postpaid to purchasers of this paper, 50 cents. For sale at this office. Send for illustrated circular. Agents wanted.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

REMEMBER.—We can make it an object for some friend desiring first-class passage at a low rate to the East to consult us before buying tickets.

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Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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J. A. JOHNSON, 307 Montgomery street (the Nevada Bank building) is the general agent of the Stiles quartz machinery, and offers easy terms for introduction.

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Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, California. Location of works, Gold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors of the above-named corporation, held on the sixth day of September, 1888, an assessment (No. 4) of Ten Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 12th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Friday, the second day of November, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. R. N. VAN BRUNT, Secretary.
Offices 13 and 15 Fremont St., San Francisco, Cal.

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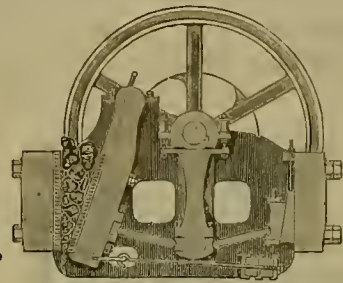
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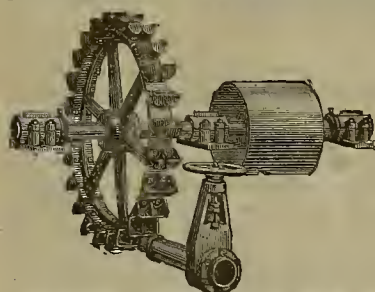
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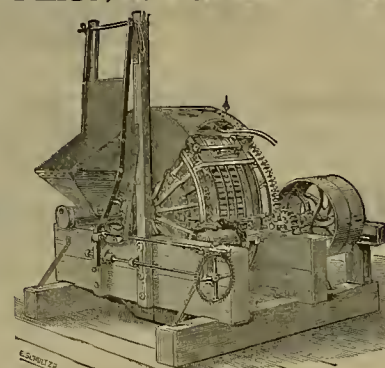
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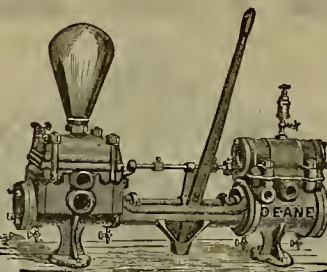
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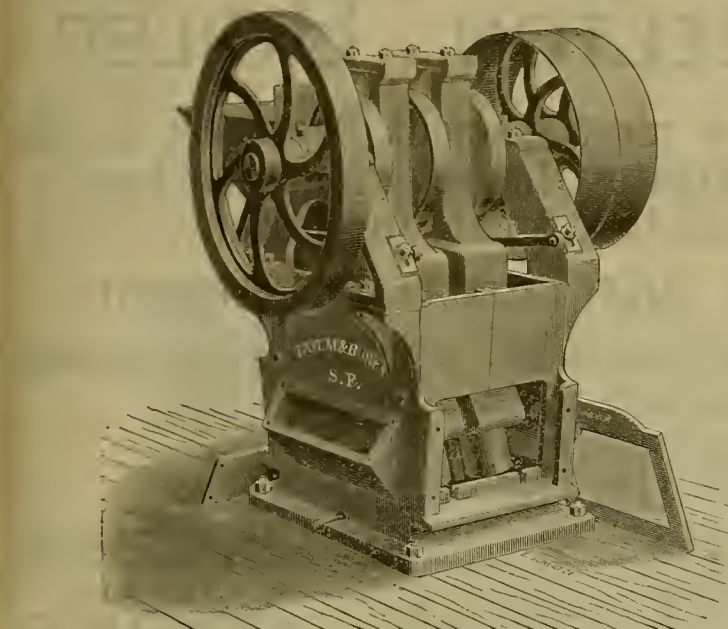
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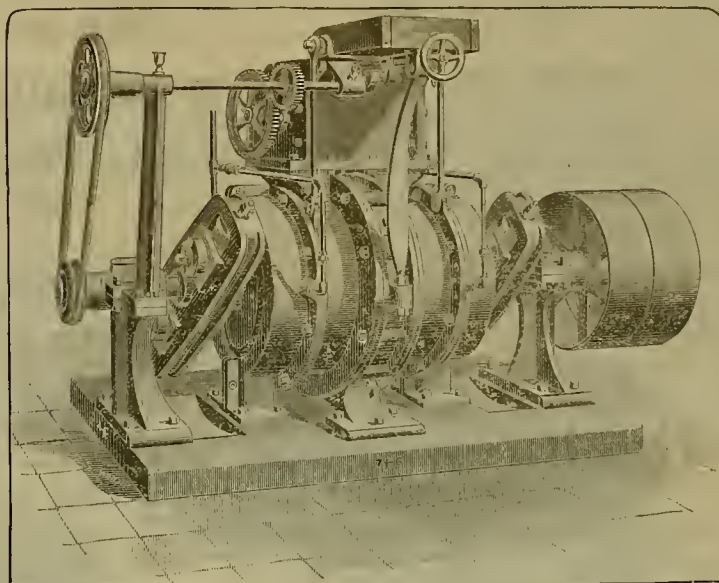
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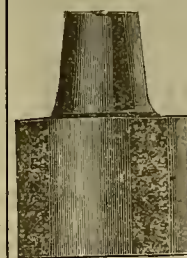
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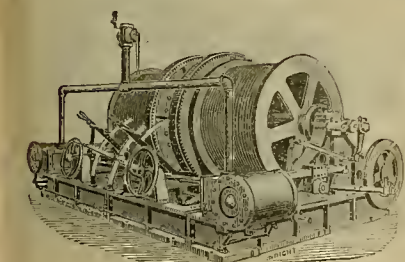
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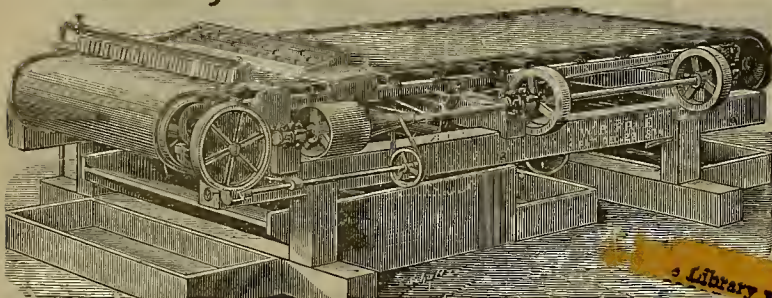
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THE MONTANA COMPANY (Limited).

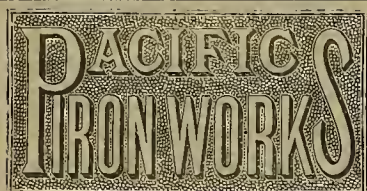
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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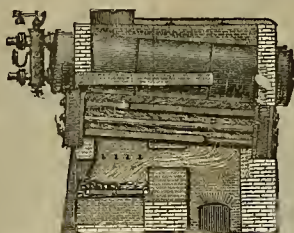
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Iron pulleys, will not break in transportation.

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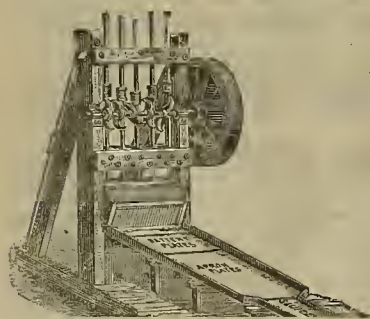
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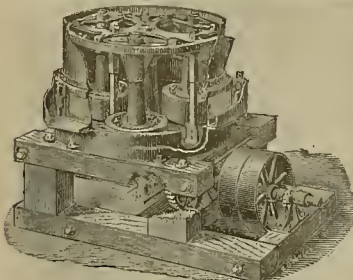
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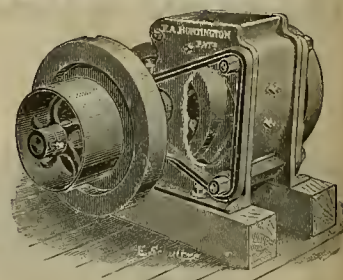
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, SEPTEMBER 29, 1888.

VOLUME LVI.
Number 13.

National Mining Institutes.

The project is being discussed in Great Britain of forming an Imperial or National Institute of Mining Engineers, which scheme embraces the federation of all institutes of mining engineers throughout the kingdom. Differences of opinion prevail as to the expediency of the plan. There are already several mining institutes and associations, more or less local in

it is conceded that the membership of such an institute as proposed would be an honor, the influence would be national, and the transactions of great value in mining literature. To mining engineers it would be very useful in many ways.

In this country we have few, if any, local mining institutes of any standing. Efforts have been made to establish them here, though with but little success. The American Institute

A Miners' Club-House.

A social organization known as the "Helping Hand" was organized a few years ago at the New Almaden quicksilver mines, Santa Clara county. The company supplied a building for the club-house, and this is well furnished and arranged for social purposes. Mr. Randol, the manager of the company, conceived the idea of fitting up a comfortable hall,

being fitted with a stage and scenery, so that it is possible for small companies to render plays there.

The Helping Hand Society is almost wholly conducted by the mine management. The "Miners' Fund," by which it is maintained, is made up by monthly contributions of \$1 from each adult employe of the company. The building of the society is shown in the accompanying engraving, which was made direct



THE HELPING-HAND CLUB HOUSE, NEW ALMADEN QUICKSILVER MINE.

character. Some of those in favor of the new institute desire to absorb all the present organizations, and it is this part of the plan that brings many objectors. Some who favor a National Institute still desire to see the local organizations remain as they are. They say that to have only one center, in London, would not confer any benefit on the mining industry or those engaged in it.

The originator of the scheme of the new institute did not desire the dissolution of the present mining institutes, namely, the North of England, the Scotland, the Manchester, the Midland, the Chesterfield, the South Wales, the North Stafford, and the South Stafford. He wanted to see all these continue, to see them preserve their local identity, have their own meetings, papers and discussions, but each subscribe to the federation, which would receive and distribute all the local transactions.

No conclusion has yet been reached, although

of Mining Engineers seems to answer all the purposes required, and it is national in character. Of late years very many valuable professional papers have been read, and the influence of the Institute has greatly increased.

Plenty of flour, potatoes and bacon stored in the cellar, a good supply of all other necessary eatables, a warm cabin, plenty of firewood and a good healthy prospect to keep him busy, and the prospector is equipped for the winter.

The mines in the Sweet Grass hills, Montana, are attracting the attention of all the old placer miners in that Territory. Rich quartz is being discovered and by another year this is expected to be an important mining district.

The first shipment of borate of lime from the Lone ranch, Curry county, Oregon, has been received. The deposit is half a mile long, 200 yards wide, and quite deep.

with reading-room and kitchen attached, and this was carried out successfully. All who pay \$1 a month to the "Miners' Fund" are entitled to the privileges and can come to the hall when open, play games, read, or take a cup of tea, chocolate or coffee, with cake. No gambling or drinking of spirituous liquors is allowed. Smoking is permitted in the main hall, also games, and in the reading room no smoking or talking is allowed. There is a good library, and all the magazines and daily and weekly papers are kept on file.

The attendance is good, the rooms being very generally frequented in the evenings. There is a cook-room where light refreshments are served at moderate cost. Entertainments of various kinds are given in the hall. Most of the amusements are arranged by the residents and are free. There are sometimes dramatic entertainments given by outsiders at which an admission is charged, the main hall or auditorium

from a photograph taken by Mr. Bulmore, one of the officers of the mine, who is a skillful amateur photographer.

The British mining machinery manufacturers are looking hopefully toward Siberia as a new source of trade. The alluvial and glacial deposits contain a rich percentage of gold derived from the trituration of the clay-slates and through quartz veins. Gold dust is found in almost all the Alpine ranges fringing the great plateau; but the chief gold-mining ranges are in the Altai and the Olekma region. Gold is also found on the high plateau in the basin of the Upper Vitim, on the lower plateau in the Nertschinsk district, and on the upper tributaries of the Amur, especially the Oldi and the Trega, in the northeast continuation of the Nertschinsk mountains. It has been discovered also on the Bureya range and on its northeast continuation with the Amguu region.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—EDS.

Five People Killed by an Explosion of a Freight Engine.

MANSFIELD, Ohio, Sept. 14.—The Baltimore & Ohio freight engine exploded at Ankenytown this morning while the passenger train was passing, killing five persons.

EDITORS PRESS:—Such casualties as the above are too frequent; by rail, at sea, on the river and ashore. Scarce a day goes by but some explosion occurs. In some cases the engineer and fireman alone go with the boiler, but seldom, as in the above instance, the passengers on another train were included in the loss.

The natural and first inquiry is as to the cause. Prolonged examination and investigation usually fail to reveal all the causes. Among them, one always present is improper handling of the boiler. Sometimes the exigencies of the service will not permit the time for cleaning and repairs necessary. From a business standpoint the boiler is run for all there is in it, the argument being—boilers must wear out, will burn out, we expect it, better economy to burn her up, get what we can out of her and replace with another than to keep a relay or spare engine for use while the regular is laid off for a day, once each 10 or 15 days for cleaning and close examination.

It would seem to be apparent that if a boiler will stand a given pressure when new, it would stand about the same strain if its integrity were preserved by repairing or replacing parts weakened by wear, for an indefinite time. There are cases where boilers are not opened in years; the owners recognize the fact that they are using more coal than formerly, but do not know why! There are locomotive boilers that finally refuse to do their work and are reluctantly sent to the shop for general repairs. The old tubes are taken out, put in a lathe, the scale turned off or chipped off with hammers, and replaced after this shell has been, as it is called, "scaled," or new tubes put in. The marine boiler being larger, admits of men going into it with the old-time "scalin" bar and "scalin" hammer, and that is, after many hours and much labor, cleaned, ready for a new trip and same work at its end.

While this scale is forming the damage to the iron is progressing for the first few days but little, but as scale increases in thickness, so increases the damage to iron by greater heating, which in time crystallizes the iron, reducing its cohesive and tensile strength.

Yet another result of scale and a very important one to owners is found in greater consumption of fuel. One-sixteenth inch of scale is very little, yet it has been proved beyond possible dispute by scientific men that it means 15 per cent waste of fuel, increasing in waste rapidly as scale increases in thickness. Many men who handle boilers deny this, because their conditions will not allow them to prove it. To obtain such proof requires so much close calculation that it is very difficult. But science has done it, and it is known, and cannot be successfully contradicted.

Men of the longest experience in handling steam-power recognize the evil and have for years sought a remedy. Thousands of dollars have been spent by them on mechanical devices with but little avail. Some of these mechanical propositions have proved palliatives, but none cures. The salts in the water causing this trouble are soluble in cold water and cannot be eliminated save by evaporation; filtration cannot, does not do it. High heat transforms them into insoluble matter, which is suspended in the water in mineral form and gradually settles upon and attaches to the iron; this leaves it to the action of chemical agents, which have the power or property of decomposing those salts, leaving them in the boiler in separate particles, which will settle to the bottom of the boiler in form of mud, when they (or it) can easily be washed or brushed out, leaving the iron clean.

A boy's experiment will prove the damage from scale: Take a tin kettle, partly fill with cement, set on stove. How long will it last, even though water is in it? Same kettle filled with water. How long will it last? The questions suggest their own answers, and at same time illustrate *Scale in Boilers*.

I. W. KINNEY.

From Calaveras County.

EDITORS PRESS:—Senator Dorsey visited his mines on the Stanislaus the past week with a view of opening them up. Prominent among his group is the "Snell." The ore of this mine gave by assay process \$55 to the ton. The Senator put down a shaft 125 feet and drifted the same length. The shoot, which was but 20 feet long, widened out to 125 feet at the bottom of the shaft, as shown by levels run. In all of the mines no timbers or powder was required, the quartz being easy to pick and the walls firm enough to require no timbering. At 100 feet a sample of the vein was taken and worked in San Francisco, which gave \$112 to the ton. Uncle Tom Goodwin came in this week with a sack of ore from a new strike on the Stanislaus; ore is exceedingly rich in high-grade sulphurets; vein four feet wide. Two mines in this vicinity have opened up very rich, but the owners, for the present, want the names of the mines kept

quiet. At Carson, the English company that bought the Stewart mines are preparing to work on an extensive scale, their first work being the construction of a ditch from the Stanislaus, at an estimated cost of \$75,000. Once this property gets under way it will operate the largest plant in the State. At Angels all is bustle and booming. The mines are now down 400 feet with the character and size of the veins steadily increasing. Angels is now an assured success.

E. A. SCHAEFFLE.

Murphy, Sept. 10, 1888.

To Mining Men.

Major Frank McLaughlin, who lately returned from Europe, where he succeeded in placing the Golden Gate mining property on the English market, says English investors are exceedingly cautious and very about American investments. He says that English people will not look at, or examine, a mine unless the title is perfect. The only title they consider perfect is a U. S. patent, and the major thinks it should be the first duty of every man who expects to place a mine on the English or any other market to secure a clear and perfect title at once. The facilities for even the poorest man in America are ample to obtain a Government patent at a trifling cost.

The second duty of a mining man who wishes to induce capitalists to take hold of mining property, is in handing his mine to fix a selling price and hold the vender strictly to this. One reason why so few mines are sold is, that the middleman place such exorbitant and fictitious values upon the property. In one instance a mine on this coast was bonded for \$10,000 and placed on the English market for a million and a half.

The leading hotels of London are filled with American speculators—many of them mere adventurers—trying to dispose of American mines to English companies. So many capitalists have been swindled that they fight shy of any man who mentions mines. The ordinary letters of introduction are useless, while a man would have to spend five or six years of his life in personally getting acquainted with people there and inducing them to take hold of mines in this country. He thinks the original owners in handing should fix a moderate and reasonable price—one that would be really justified by the mine itself, and hold the middleman or speculator to this. Then capitalists would regain their confidence and be more willing to invest.

Major McLaughlin found by conversing with leading financiers that only a limited number of people in England make investments in the way of speculation. In fact, out of the many millions, less than 450,000 English people make investments in mines, railroads, canals, etc. These all run in grooves; thus the railroad men invest simply in railroads, the mining class in mines, the canal men in canals, and so on throughout the list.

When the major reached London he was told by some of the leading moneyed men of that city: "The best thing you can do is to fold up your papers, put them away in your trunk, and have a good visit for a month and return without trying to induce men to invest, for no one is able to put mines on the market at present." It was nearly a fact, too, for the Golden Gate was the only American mine placed on the English market for three months. At the conclusion of his trip, he spent a week in Paris for a rest, took a run then up into Scotland and went to see the famous gold mine of Wales.

In speaking of mines, Major McLaughlin says the *Financial News*, edited by Mr. Harry Marks, for a long time connected with the *New York Herald*, is the leading financial paper in London. It is looked upon as a great authority in mining matters for the proprietors to investigate the title and value of mines very carefully. An indorsement from that paper is almost a certain guarantee of success. A newly organized company for investigating the title and worth of mining property is called the Mining Investment Company. This company is intended to put an end to some of the swindles that in the past have taken place. The major tells us that Ireland, contrary to general ideas, is one of the richest of countries, so far as capital is concerned. The savings banks of all Ireland are overflowing with money, but capitalists do not like to make investments away from home. They prefer canals, street cars, railroads and other home investments.—*Oroville Register*.

AN AMERICAN MINING ENGINEER APPRECIATED.—The Shah of Persia has requested Chas. A. Ashburner of the United States Geological Survey to take charge of the Persian engineering corps. The Shah is of the opinion that valuable deposits of coal, iron, petroleum and perhaps the precious metals are to be found in Persia. Hitherto nothing but turquoise has been mined in that country. Mr. Ashburner is now stationed at Pittsburgh, Pa. He has not yet made his decision regarding the Shah's proposition. Mr. Ashburner is a young man of great ability as a mining engineer and geologist, and organized the survey of the anthracite fields for the Geological Survey of Pennsylvania. He is too valuable a man to be let go to this far-away portion of the globe, and we sincerely hope his decision will be to remain at home, where there is just as large a field for his talents as there is any place else in the world.

Regarding Changes of Situations by Mechanics.

There is a quite prevalent idea that a mechanic who changes from one position or shop to another frequently necessarily has something in his constitution or make-up which renders him unfit to be depended upon; and there are many who utterly refuse to believe that such a man can be either a good mechanic or possessed of any ability of whatever kind. It must be acknowledged that mechanics are often met with who seem to hear out this opinion; but, on the other hand, every one who has been associated with mechanics to any great extent must know plenty of them who have made many and frequent changes, in some cases extending through a number of years, and have finally found a place in which they were eminently successful, probably more so than they could by any possibility have become in any of their previous positions, if, indeed, their final success was not due, in a great measure, to the changes preceding it.

It is, of course, true that many and frequent changes by a workman are often caused by a fickle or discontented disposition, and often also by the fact that the person concerned has a much greater ability in obtaining situations than in keeping them after he has obtained them. But because some mechanics make frequent changes for such reasons, by no means justifies the universal condemnation of every one who is given to changing about.

It should always be remembered that there are many good reasons for making changes which are liable to present themselves to any mechanic at any time; and that it is as illogical and foolish for a mechanic to disregard or ignore such reasons simply from a general indisposition to change, or dread of leaving old associations and friends, as it is for any one else to decline to take a given course when good and sufficient reasons for so doing present themselves.

There are, of course, certain disadvantages which usually accompany a change of location, but it should not be forgotten that there are also certain advantages often to be gained by such changes, and that, other things being equal, the person most interested is best qualified to weigh, compare and decide which course to pursue; and that often there are reasons for changing which present themselves to him very forcibly, but which, from their nature, cannot be known or understood by others.

Most young men especially are benefited by moving about considerably. It is comparatively easy for a young man to adapt himself to new conditions and to take hold of work differing in its nature from that to which he has been accustomed, and the ability to do this, acquired during the period of life when it is easy to acquire it, is apt to be a decided advantage in more mature years.

Who has not seen men grown old in the service of some employer with whom they have learned their trade, perhaps, and have never worked elsewhere, and who are really in a pitiful situation of dependent helplessness? Being almost totally unacquainted with methods of doing work outside of the shop in which they have been trained, and not having acquired while young that facility for adapting themselves to new conditions which it is seldom possible to acquire during the years of mature life, they painfully feel their helplessness and dependence; and there are too many employers who do not hesitate to take advantage of it. Then, too, in judging of the conduct of employers in these matters it should be remembered that the same causes which have made the workman dependent upon him have also usually made the workman less valuable to the employer.

In almost every shop there are men to be met with who would probably be greatly benefited and developed by changing about a little, widening their horizon, and extending their acquaintance with other mechanics and their way of doing things.

The old proverb is true enough, "A rolling stone gathers no moss;" but it is well to consider that the gathering of moss may not be the only object of the existence of stones, and that, supposing it to be desirable that all stones should gather moss, there are many of them so situated as to make the gathering of it impossible, and not to be hoped for without some preliminary rolling about in order to secure more favorable conditions for moss, gathering.—*Am. Machinist*.

EXOTIC FLAX.—M. J. De Turoh of Lille, France, has brought to light a textile plant of Chinese origin which he calls exotic flax. It is claimed for this material that in its native country its cost is from 1½ cents to 2 cents a pound, and from 2½ to 3 cents a pound laid down at Marseilles, whereas flax costs, according to quality, from 10d. to 1s. 9d. per kilogramme. The exotic flax, without assorting, is fit for the coarsest fabrics or the finest, the latter only requiring the usual more careful and complicated preparation. The finest lace end the strongest cord can be made from it, as well as an infinite variety of intermediate fabrics, such as tablecloths, napkins, carpets, plush, wearing apparel, etc. It is spun without combing, thereby saving 40 per cent of waste incident to flax combing. The material can be worked with the ordinary flax machinery. The textile can be mixed with flax, silk, wool and cotton. Its strength is very great, and a sewing thread can be spun which requires no twisting. The refuse is utilized, and can be worked in the same manner as cotton, which it closely

resembles. If desired, the long fiber can be broken up by an ordinary crusher and reduced to the usual length of cotton fiber. The plant utilized by M. De Turoh is that which produces the Tonquin bean, and next to rice is considered the most important crop of China.

Old Steamboating Days South.

The burning of the magnificent steamer Edward J. Gay, on the Mississippi recently, removed one of the landmarks of the Western steamboat business. She was one of the last of that magnificent fleet of floating palaces that were the pride and admiration of the traveling public. Plying between New Orleans and Vicksburg, Natchez, Memphis, Louisville and St. Louis, they formed for three-quarters of a century the luxurious means of travel which combined all the elements of speed and comfort now to be found on the first-class transatlantic steamers. The wealthy planters were the generous patrons whose princely lavishness of expenditure built up this system. There is nothing now in modern travel comparable to these great steamers except the Hudson river and Long Island sound steamers. The class of patrons, however, differed from the tourist to be found on steamers nowadays. They were known to one another by name or estate, they had their own landings, and the transportation of their enormous crops was the basis of the prosperity of the steamboat business. No one who ever made a trip from New Orleans to Louisville in the palmy days of the Eclipse, the R. E. Lee, the J. M. White, Natchez or the Ed Richardson can ever forget what a delightful experience it was. The social features of it were as charming as they were typical of all that was delightful in Southern life. All this has been changed by the encroachments of the railroad. That phase of travel has disappeared and for it has been substituted slow trains, dirty cars, irregular connections, scant meals and the enforced propinquity of the great unwashed public. A few old pilots, a few uncouth freight-carriers and a few coal-packets are all that is left to tell the tale.

WOOD-PULP MANUFACTURE.—This rapid development of wood-pulp manufacture is an intimation that there is a new industry to which our great forest areas may be, in part, very profitably devoted. For, apparently, it doesn't matter much what species of wood is used in this production of pulp—possibly spruce is preferred in the extreme Northeast quite as much on account of its convenience as for any other reason. At any rate, it is quite certain that poplar, hemlock, cypress, and several other common woods would answer the purposes of the business acceptably; and it is also contended that white pine would do. What may be regarded as a specially attractive feature of this wood pulp industry, from the standpoint of economy, is the fact that it utilizes the waste incident to timber-cutting on a large scale. Only the limbs of the fallen timber are taken, so there is no competition possible with lumber manufacturers, rail splitters, or others having as merely for the bodies of the trees. The only domain treasured upon is that of firewood, more particularly in the corded form; but surely there could be no grievous losses in this direction to the fuel supply. For naturally the demand on behalf of wood-pulp manufacture would center itself where the timber is most abundant and cheapest; and in this way large quantities of felled timber, now left to feed forest fires or decay on the spot, would be turned to profitable account commercially.

RAILROAD CARS IN PROPHECY AND HISTORY is an extraordinary book, in which the author, Rev. D. T. Taylor, presents proofs (?) of the nearing end of the age. The author says: "A railway train moving but a mile a minute dashes over the ground 88 feet every second. This is literally to dart or shoot. Ancient travel was at a snail's pace compared with the speed of the man whose hand controls the engine. This is the chariot of fire! Settle in your hearts, thou, reader, that here is a divine prediction made 2500 years ago in Asiatic lands of the coming of an extraordinary age of travel—travel in great haste; and this infers new methods, new facilities and new powers at the command of man. Are such methods in use? Then the prediction is accomplished, the consummation near." Again: "The discovery of the practical use of steam and electricity was reserved for these closing days of this world's history, when the king's business would require haste." The book reads like the work of one who is sincere, but so chimerical as to be hovering on the border between sanity and insanity.

COLORADO OIL FIELDS.—At the late meeting of the American Association for the Advancement of Science, held at Cleveland, Ohio, Prof. J. S. Newberry gave an interesting talk on "The Oil-Field of Colorado." This oil-field, he said, was situated in the valley of the Arkansas, above Pueblo, about the town of Florence. The oil is of excellent quality, has a green color and an agreeable odor. It yields on distillation 40 per cent of excellent burning fluid and nearly 60 per cent of superior lubricating oil, which contains much more paraffin than the oil of Pennsylvania. The oil-field of the Arkansas valley is extensive and the yield of oil may apparently be increased indefinitely. The source of the oil is undoubtedly the carbonaceous matter of the Colorado black shale, from which it is being spontaneously distilled,

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

F.—Siphon Pumps (or Ejectors), Solution and Sluicing Pumps.

The siphon pumps, made by A. Aller, 109 Liberty street, New York, are lined with hard lead and have a platinum steam nozzle. Size No. 4, costing \$88, is the most suitable for a 16-foot leaching-tank. In using the siphon pumps for leaching, two precautions are necessary: first, the siphon pump must be upside down (suction up) so that all solution coming from the leaching-tanks, running down the sloping hose, may fall directly into the steam in the ejector. Otherwise, or if the hose has a sag in it, the siphon will act only intermittently, ejecting first steam, then solution, then steam, etc. Secondly, the steam used must be dry, which can only be secured in this case by covering the steam pipes. The difference in effort between wet and dry steam for siphon pumps was illustrated at a mill in Arizona. The steam was conducted about 200 feet in an uncovered 1½ inch pipe. The result was that the siphon pump would not lift six inches, and was therefore useless. It was then used near the boiler, and lifted 20 feet, and forced the solution an additional 20 feet.

In addition to one siphon pump for each leaching-tank, there is also one for returning the clear solution coming from the filter-press to the sump of the solution pump.

If lead is to be precipitated with soda ash, one siphon pump (which should be a No. 6) will also be necessary for each of the three lead precipitating-tanks. A siphon pump is also sometimes necessary in making up the extra solution in one of the storage-tanks; for in case the chemical in the box with perforated bottom should not be dissolved by the time the right volume of solution had run into the storage-tank through that box, some of that solution would have to be forced up and circulated through the chemical-box until the chemicals were dissolved.

The solution pump should be a Knowlss 6½ double plunger, with 8-inch steam cylinder, 5-inch plunger and 12-inch stroke, and a 4-inch suction and discharge. The fire pump for sluicing should be a Knowlss (or corresponding size of other make) single-cap pattern, with 10-inch steam and 5-inch water cylinder, 12-inch stroke and 4-inch suction and discharge.

G.—Apparatus for the Mechanical Treatment of the Sulphides.

This consists of a pressure-tank, Johnson filter press and steam drier. The details, the pressure-tank and steam drier, are shown in Figs. 1 to 3 inclusive. The filter press, "circular pattern," is furnished by John Johnson, Franklin square and Cherry street, New York. The size should be 18 inches, with 24 chambers, 12 two-inch distance-rings, one dummy plate, pressure gauge, indicating as high as 150 pounds, one dozen extra tension-hooks and screws, three sets of "double-chain" filter-cloths, but no pump, pulleys, shafting or hangers. The cost of the above is about \$290 f. o. b., New York. Much trouble has hitherto been encountered in using a pump for forcing sulphide into the filter press, but the pressure-tank gives no trouble. If the pressure-tank and press are arranged as shown in the drawing, very little steam pressure is needed, as most of the sulphides run by gravity into the press. It is likely that compressed air will eventually take the place of steam for this purpose.

If the sulphides are to be dried by steam, the use of the filter press cannot be avoided. Near the front of the steam drier is a small windlass by which the pans of sulphide are lifted into or removed from the steam drier. At the side of the steam drier is the sampling floor and scales. The sampling floor is best made of iron plates, the larger the better, closely jointed.

H.—Miscellaneous.

Experience has shown that a separate steam boiler for the leaching plant is advantageous, even when the regular mill boilers are available. The steam for the leaching plant can thus be maintained at a greater pressure than would be advisable in the regular mill boilers, the filter press, siphon pumps and steam drier doing much better work with high-pressure steam. Moreover, the leaching plant is thus rendered independent of the rest of the plant, and can be run when the mill boilers are shut down.

In the rear of the leaching-tanks is a car-track having a slight inclination, which answers not only for bringing ore from the rest of the mill plant, but also for conveying chemicals from the chemical-room to the leaching-tanks and chemical-boxes if the extra solution is made up on the ore. The car for chemicals runs over the scales in the chemical-room, where the bluestone and hyposulphite are stored. The caustic soda and sulphur are in the upper chemical-room, in which is also a pair of platform scales. In addition to the scales already mentioned, there must be another set for weighing the ore delivered to the leaching-tanks.

If the tailings cannot be sluiced out, owing to scarcity of water, they should be removed by cars running under the leaching-tanks, as shown in the drawing.

The whole building should be well lighted,

particularly over the precipitating-tanks, a skylight being placed in the roof over each of these tanks.

The platform around the leaching-tanks should be about 2½ feet, and that around the precipitating-tanks 4 to 6 inches, below the top of these tanks respectively.

All treatment of the sulphides below the sulphide storage-tank takes place in a room shut off from the rest of the mill.

IV. Expenses. A.—Comparative Values of Chemicals in the United States and Mexico.

The following table gives the average values of chemicals, per hundred pounds avoirdupois, in Mexico, near the railroad, as compared with similar places in the mining regions of the United States:

	Mexico.	United States.
Hyposulphite of soda	\$ 8 70	\$1 25
Bluestone	9 50	5 75
Caustic soda	10 75	5 50
Sulphur	5 50	3 50
Soda-ash	7 00	3 50
Sulphuric acid (170-lb drums)	16 00	3 75
Average	\$3 60	\$4 37

The cost of all the chemicals averages about twice as great in Mexico as in the United States. But the use of the acid can nearly always be omitted when the extra solution is used. The value of chemicals in Mexico therefore averages 8.3 cents per pound, or 1.9 times as much as in the United States.

B.—Cost of the Stock Solutions.

The total amount of hyposulphite for stock solution for works of various capacities has been given as 3281, 1875 and 1406 pounds for works of 100, 50 and 25 tons respectively.

The corresponding costs in the United States of these stock solutions are therefore \$140, \$80 and \$60.

C.—Cost of Precipitating the Silver from the First Wash-Water by Various Methods.

Table XVII gives the cost of precipitating the first wash-water from roasted ore, and the values of the precipitates. Except in Mexico, where acid costs about five or six times as much as in the United States, there is little difference in cost between the method by acid and iron and that by sodium sulphide. In the United States, if the wash-water is acid, the cost is in favor of acid and iron by three or four cents per ton. In cases where the method by dilution can be used, of course the expense of precipitating is merely nominal. But generally, on account of the small cost and greater thoroughness of the first two methods, one of them should be adopted in preference to the method by dilution.

D.—Cost of Precipitating the Metals from the Leaching Solutions.

In all the mills mentioned in Table XXIII, except the Rubio in Parral working on Veta Grande tailings, sodium sulphide was used as a precipitant, and the cost of precipitating per ton of ore, as there given, is the cost of the sodium sulphide.

The comparison in cost between sodium sulphide and calcium sulphide is more favorable for the former in the United States than in Mexico, as the cost of lime in Mexico and the United States is the same, while the price of caustic soda is very high in Mexico, being usually—sometimes more than—twice as great as in the United States. Nevertheless, even in Mexico, the sodium sulphide is much superior, both in cost of chemicals and the time, labor and heat required in its preparation. A comparison between sodium sulphide and calcium sulphide, made at Cusi, may be found in the *Mining and Engineering Journal*, Vol. XLII, page 353, showing the sodium sulphide to be the cheaper by 22 cents per ton. A comparative test at Somherete, also made by Mr. Watson, resulted in the adoption of sodium sulphide in place of calcium sulphide, although caustic soda, at that time, cost 14 cents per pound (in Mexican silver).

E.—Cost of Various Extra Solutions for Acid-Roasted Ores.

A preceding section gives the weights of bluestone and hyposulphite required per ton of ore for extra solutions of various strengths. Table XXIV gives the corresponding costs of these chemicals and extra solutions per ton of ore. The cost of the extras, including the precipitating of the metals contained in them, varies from 49 cents to \$1.24, the latter representing the strongest extra solution ever used, and used, moreover, under the most unfavorable circumstances, as regards the quantity of hyposulphite required. A corresponding table of extra solutions for raw ores would show less cost for each extra, because, for the same amount of hyposulphite per ton, the stock solution will average in strength about 40 to 50 per cent higher than in the case of an acid-roasted ore, while the volume of extra solution per ton of ore is less. No table can well be given for simple alkaline roasted ore. A table for alkaline-arsenical roasted ores would be about the same as for acid-roasted ores.

F.—Comparison Between Raw, Acid-Roasted and Alkaline-Roasted Ores, as to Cost of Chemicals.

The difference in cost of chemicals per ton of ore is much in favor of alkaline, as compared with acid ores. For the former, the cost of bluestone is about 27 per cent, of hypo, 43 per cent, and of sodium sulphide, 35 per cent, less than for the latter, as is shown in Tables XIV

and XXIII. For raw ores, the average cost of chemicals is still smaller, being about 20 per cent less than for alkaline-roasted ore.

G.—Disposal of the Sulphides.

The following statistics are furnished by the manager of one of the largest mills using the Russell process, the product being from 60,000 to 80,000 ounces of silver per month.

The monthly shipments are divided into two parts, one being sent to the Chicago and Aurora Smelting and Refining Co. at Chicago, and the other to E. Balbach & Sons, Newark, N. J. The division is made for the double purpose of having two checks on the work of the assayer at the leaching-mill and also of having two re-

TABLE XXIV.

COST OF CHEMICALS FOR EXTRA SOLUTIONS OF VARIOUS STRENGTHS AND OF THE PRECIPITATION OF THE SAME

	Total cost of using ex. soln.	Cost of bluestone per ton.	Cost of hypo per ton.	Cost of precipitating " "	Total cost of using ex. soln.	For a stock solution containing 6 to 10 of one per cent hypo.	For a stock solution containing 8 to 10 of one per cent hypo.	For a stock solution containing one per cent hypo.	For a stock solution containing 1.2 per cent hypo.
Cost of bluestone per ton.	5.75	5.75	5.75	5.75	5.75	1	2	3	4
Cost of hypo per ton.	1.25	1.25	1.25	1.25	1.25	1	2	3	4
Cost of precipitating " "	1.00	1.00	1.00	1.00	1.00	1	2	3	4
Total cost of using ex. soln.	8.00	8.00	8.00	8.00	8.00	3	6	9	12
Cost of bluestone per ton.	5.75	5.75	5.75	5.75	5.75	1	2	3	4
Cost of hypo per ton.	1.25	1.25	1.25	1.25	1.25	1	2	3	4
Cost of precipitating " "	1.00	1.00	1.00	1.00	1.00	1	2	3	4
Total cost of using ex. soln.	8.00	8.00	8.00	8.00	8.00	3	6	9	12

finers as checks upon each other. As the monthly shipments occupy a number of packages, the division is made by sending the even numbered cases to one refiner and the odd to the other, thus securing an average sample of the whole lot for each refiner. The result of this method is that the returns from both refiners are entirely satisfactory, the assays made at the mill and those by the buyers being virtually identical. As soon as the shipments are received by the buyers they are weighed, sampled and assayed, the returns being made within a week after the shipments are received. Within a week after instructions are received by the refiner to work the sulphides, the payments are made by check on New York, the silver being paid for on the basis of New York price on day of settlement, and gold at the rate of \$20.60 per ounce.

The Balbach Co. pays 99 per cent of the value of the silver and full price for gold, and charges \$100 per ton for treatment. The Aurora Works pay 98 per cent of the value of the silver and charge nothing for treatment. Their rates for gold are not known, as the sulphides in question contain only a trace. The Balbachs pay for the least trace of gold. The rate paid for copper is generally \$1 per unit, although not in the case above mentioned, as very little copper is present.

The sulphides from the Somherete mill are treated at the Argo Works, Denver, Col. The price paid by these refiners is 97 per cent of the gold and silver (silver at New York quotations and gold at \$20 per oz.) without any charge for treatment.

The sulphides from the Somherete mill contain \$700 to \$800 in gold per ton. Taking into account the silver entering the cupel, the mill assays for silver average about 0.6 per cent above those of the refiners. Without taking this into account, the refiners' assays are a little higher than the mill assays. The average of the assays on gold agree within 0.1 per cent.

H.—Details and Summary of Cost of Running the Plant.

The following statement gives the approximate amount of labor required per day of 24 hours, in the leaching department only, for a plant of 100 tons capacity, as deconstructed in various mills:

2 men on leaching-tanks at.....	\$4 00	\$8 00
3 " as helpers at.....	2 50	7 50
2 " on precipitating-tanks at.....	4 00	8 00
2 " on pump, press, drier, boiler, etc. .	4 00	8 00
2 " as helpers at.....	2 50	5 00

Total.....\$36 50
Cost of labor per ton.....36½ cents.

The three helpers at the leaching-tanks attend also to the preparation of the sodium sulphide, which occupies about three hours every two days, and also to the preparation of the extra solution, which occupies one man about two hours, two or three times each day. Of the three helpers, one is on night shift and the other two on day shift, the sluicing out of the tailings being done only on day shift, and occupying one man about four to five hours each day. For 50-ton tanks, the two

men and three helpers are more than sufficient, as the labor is much less than where ten-ton tanks are used. Also the two men and two helpers are more than sufficient for the solution pump, press, drier, boiler, sampling of the sulphides, etc. If the plant is arranged as described, the pressing of the sulphides will occupy only one man three days per week; the removing of the dry sulphides from the steam drier and replacing with wet sulphides occupies two men about four hours every three days, and the sampling also two men about six hours every three days. The boiler needs but little attention, the steam required being about as follows: A very small amount nearly all the time for heating the solution in the storage-tank and for the steam drier; steam to run two siphon pumps or ejectors, five hours per day; to press sulphides, three days per week; to run the fire pump (if tailings are sluiced), three to four hours each day; to pump the solution to the storage-tanks all day, at intervals; and for the preparation of sodium sulphide one hour every two days. At Ydras, the amount of wood used per day was three-fifths of a cord, for pumping solutions and for making calcium sulphide. Four times this amount (or two and a half cords) would therefore probably be enough for all the above purposes.

As to the removal of tailings, the cost of shoveling out and removal at Cusi was \$1 to \$11 cents per ton of ore. At Somherete, the filling of the tanks from the cooling-floor, and shoveling out and removal of the tailings, cost only 15 cents per ton, labor being cheaper than at Cusi.

At Ydras, the cost of labor and material for repairs on the leaching plant was only \$50 per month, or about four and a half to five cents per ton. At Cusi, it was several times as great per ton, owing to the poor arrangement and condition of the plant.

The silver-bearing solution coming from the ore-tanks to the precipitating-tanks should be conducted in rubber hose. But at the Cusi mill this silver-bearing solution was conducted from the ore-tanks to the precipitating-tanks by means of iron pipes, and these pipes, which are practically the only ones attacked by the solution, had to be periodically replaced. The solution-pump was set on top of the solution sump instead of level with the bottom, and required constant repairing in order to produce a vacuum sufficient to lift the solution. The 22 small leaching-tanks and corresponding valves, piping and siphon pumps also required considerable attention.

For the plant described and for 100 tons per day, the total cost of labor and material for repairs should not exceed \$150 to \$200 per month, or five to seven cents per ton.

The total cost of the various operations and chemicals required for 100 tons per day is given in the following statements, which show approximately the minimum and maximum running expenses per day of 24 hours at the rate of 100 tons per day, in the United States, as shown by actual experience. The cost of charging the ore into the tanks is not included. It would vary probably from 10 to 18 cents per ton. The removal of the tailings is supposed to be by sluicing; if by shovels and cars, the expense may be put at about 15 cents more per ton.

APPROXIMATE COST OF RUNNING LEACHING PLANT AT 100-TONS CAPACITY PER DAY OF TWENTY-FOUR HOURS.

Minimum.	Per Day.	Per Ton.
Labor, 11 men at \$3.....	\$ 33 00	\$0 33
Fuel, 2½ cords at \$4.....	10 00	0 10
Chemicals.....	56 00	0 56
Repairs, \$150 per month.....	5 00	0 05
Assaying, ½ total for mill.....	7 00	0 07

Totals.....\$111 00 \$1 11

Maximum.

Per Day.	Per Ton.
Labor, 13 men at \$3.....	\$ 39 00
Fuel, 3½ cords at \$6.....	21 00
Chemicals.....	100 00
Repairs, \$450 per month.....	15 00
Assaying, ½ total for mill.....	8 00

Totals.....\$183 00 \$1 83

(To be Continued.)

BARNARD'S COMET.—This comet, which was first seen by Prof. Barnard at the Lick Observatory, promises to be a very interesting visitor to our solar system. A telegram from the Dudley Observatory at Albany of the 13th instant says: "The comet has apparently remained stationary since its discovery, so that the determination of the true orbit has been a work of great difficulty. The results reached are regarded as merely approximate. According to these the comet is now about twice as far from the earth as the sun, or about 100,000,000 miles. At the same time it is about 170,000,000 miles from the sun. The comet is moving toward the earth at the rate of about 3,000,000 miles daily. About the middle of November the comet will be 60 times as bright as when discovered."

MASTER AND WORKMAN.—Edward Atkinson, in the September *Forum*, says: "The old order of personal intercourse between master and workman is gone. The small, self-contained community in which there were none very rich and none very poor has almost disappeared. The new forms of society are not yet shaped or molded. The one thing most needed now is that the rich men shall know how the workmen live, and the workmen shall know how the rich men work."

CAMPAIN WHISTLES.—A "he-he" whistle factory, near Erie, has manufactured 500,000 of them already this campaign, and is making 20,000 per day.



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One inch.....	2.00	5.00	14.00	45.00

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DEWEY & CO., PATENT SOLICITORS.

A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO

Saturday Morning, Sept. 29, 1888.

TABLE OF CONTENTS.

ILLUSTRATIONS.—The Helping Hand Club-House; New Almaden Quicksilver Mine, 205. Details of Dry House, Russell Process, 209.

EDITORIALS.—National Mining Institutes; A Miner's Club House; Passing Events; Agricultural Title, etc.; Mineral Lands; Economics Gone Mad; The Richmond Consolidated, 208. The Russell Process; Coal Mining in Japan; A Miner's Death, 209.

CORRESPONDENCE.—Five People Killed by an Explosion of a Freight Engine; From Calaveras County, 208.

MISCELLANEOUS.—To Mining Men; Regarding Changes of Situations by Mechanics; Old Steamboat Days South, 206. The Russell Process, 207.

MECHANICAL PROGRESS.—The Bessemer Process an American Invention; New Process for Wire Manufacture; Lead Pipe—How It is Made and Used; Hints on Working Steel; Rifling Gun Barrels; The Progress of the Air Brake, 210.

SCIENTIFIC PROGRESS.—Magnetic Force Acts Through Every Known Substance; Making Gas from Oil; Where Will Discovery Cease; A Good Word for the English Sparrows; Under the Ocean Waves; Action of Electricity on Albumen and Alcohol; Traces of an Ocean Earthquake; The Great Climatic Cycle; The Brain of the Chimpanzee, 210.

USEFUL INFORMATION.—Floating Soap and Javelle Water; How He Beat the Automatic Weigher; How to Make Grond Glaze; A Candle and a Gas Extinguisher; Sizes of Common Things; The Flight of Pigeons and Bees; What Is a Sleeper; Paper Gunpowder; Natural Soap Well; Indians and their Industries; The Bee Industry; The Ox and Dog in China; A Noted Horseshoe, 211.

GOOD HEALTH.—The Sightseer's Headache; Danger in Filters; Electricity as a Pain-Killer; Iodine for Ant Stings; An Electric Disease; Sweat Glands; Medical Properties of Emmenistie; To Remove Tartar from the Teeth; Danger from Hemlock Boughs, 211.

ENGINEERING NOTES.—The Panama Canal; The Projected Railroad Across Asia Minor; Chinese Canals; The Roughkeeper Bridge, 211.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 208-09.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 216.

Business Announcements.

[NEW THIS ISSUE.]

Typewriter Copyists—Misses Devlin.

See Advertising Columns.

Passing Events.

While many events have passed since our last writing, only a few of them have been of sufficient importance, or of a kind to require mention here. The mining industry continues everywhere prosperous, and the outlook encouraging, the field broadening and filling up at the same time. The use of the hydraulic elevator in working the enjoined mines, while it does not accomplish all that might be desired, is being employed by several companies as the best that can be done.

The successful laying during the week of the corner-stone in the big dam in the American river, near Folsom, constitutes a notable incident in the history of our hydraulic enterprises.

The political caldron which began to simmer early in the summer, having a little later on been brought to a hubble, is now boiling vehemently, its intensity increasing daily and nightly to the delectation of the politicians.

The public fairs, State and county, have closed, or are about to close, after a generally successful season, the most of them having been largely attended and liberally patronized. The exhibits made were fairly, and, in most cases, highly creditable.

Agricultural Title to Mineral Lands.

There is a very general complaint among the miners of this and other States, that the area of ground on which to prospect is rapidly being narrowed in a manner never contemplated by the laws. As this system is being carried out day by day, in a few years much of the mineral lands will be covered by agricultural claims, so that the prospector's vocation will be gone. In the mountain counties of this State a large proportion of the land has been returned as mineral, and as such, by the law of Congress, it became exempt from entry under existing homestead and pre-emption laws.

Subsequently, under instructions issued by the Department of the Interior, pre-emption and homestead claimants were allowed to file their respective claims, provided that the non-mineral character of the lands, or their being more valuable for agricultural than mining purposes, was proved. Under those instructions most of the earlier entries were made, and when, later on, under instructions issued by Mr. Schurz, the then Secretary of the Interior, all lands hitherto classed as mineral were declared to be open to pre-emption and homestead entries, the owner was required to furnish the proof that the land was mineral in character in order to save his claim. Thus a very severe blow to the mining industries was struck.

Pre-emption and homestead, unless covering great areas of lands in the mining districts, immediately followed the above ruling. This caused such strong protests from the miners in some sections that some particular townships were exempted from the ruling and the settler was then required to furnish proof as to the non-mineral character of the land before his entry would be allowed. But this measure of apparent relief soon proved itself entirely unsatisfactory, and the acquiring of cheap agricultural titles to valuable mining or timber land goes on almost unchecked. The following explains the method generally adopted to obtain agricultural title to mineral lands:

A person settles in a mining district, fences in and cultivates a garden spot around his cabin or spring and enters a pre-emption or homestead claim for fully 160 acres. After that he earns a living by cutting or selling the timber from his claim to the miner or some local saw-mill, or goes to work for some mining company in the neighborhood. After the lapse of the prescribed time, he advertises to prove up his claim and names as witnesses his nearest neighbors, who at the same time have advertised to offer final proof for their respective claims of the same class. Thus, by acting as witnesses for each other, each paying only his own individual expenses, the cost of final proof is reduced for them to a minimum.

On the other hand, the miner who has located and is in possession and working a bona fide mining claim is not only obliged to pay his own expenses to the nearest land office, but also all the expenses of all his witnesses to prove that his mine is a valuable mineral deposit; otherwise he must lose his possessory title thereto. Often the various expenses of travel, witnesses, etc., make a contest on the part of the miner impossible. Therefore nobody appears to challenge the testimony of the agricultural claimant, so his final proof is accepted. Against the foregoing assertion it may be said: If the agricultural claimant or his witnesses perjure themselves, the miner has his remedy. Why does not the miner prosecute them for this? In an article to follow this we shall state the position of the miner on this part of the question.

EBERHARDT AND MONITOR.—A meeting of this company was held in London on the 1st inst., and a scheme for reconstruction was adopted. By the terms accepted, Mr. Samuel Slater, the liquidator, was authorized to sell and transfer the business, property, mines, machinery, assets, etc., of the company (except uncalled capital) to a company already registered with a capital of £75,000, divided into 300,000 shares of 5s. each. The new company shall pay all the debts and liabilities of the Eberhardt Company, and allot and issue to the holders of debentures four fully-paid preference shares of 5s. each for every £1 of debenture issued by the old company, and such preference shares should be entitled to a non-cumulative preference dividend of ten per cent, after payment of which such preference shares should rank ratably with the ordinary shares, share for share, in the

division of profits, and have a preferential claim on the assets in the event of liquidation. The new company should allot and issue to the liquidator 248,569 shares in the new company of 5s. each, upon which there should be credited 1s. per share. The liquidator was to be authorized to continue the company's business pending the transfer to the new company, which should accept the Eberhardt's title to the mines and premises.

Economics Gone Mad.

David Wells, who has written much on the subject of tariffs and other economic questions, has published recently in the Eastern press a series of articles, wherein he attempts to show that the industrial disturbances so frequent, and almost continuous for the past 20 years, have been due to the introduction of labor-saving machinery and processes, these, as he alleges, having worked to the detriment of the capitalist and the wage-earner alike. Both, contends this writer, have suffered just to the extent that these inventions have been successfully multiplied. They have injured the former by rendering the improvements in which his money was invested partially, if not wholly, useless, and the latter, by rendering his skill and experience of no avail, very often throwing him out of employment altogether.

While Mr. Wells does not, like Henry George, argue that the increment of wealth tends to increase the poverty of the workingman, he stoutly maintains that all labor-saving agencies do have that effect, impoverishing as well the investor in manufacturing or other productive pursuits. But in this we think our essayist is in error. That he greatly exaggerates the evil inveighed against can hardly be questioned. In the first place, as we all know, very few of these improved mechanisms and methods succeed at once in supplanting the old ones. However superior, it takes time to introduce them—so much time, generally, that the proprietor of the establishment, whatever it be, is enabled to adapt it to the peculiarities and requirements of the new invention, which are rarely ever so radical as to make this impossible. In like manner the operative, with his already acquired knowledge and practical skill, is empowered to master whatever is especially difficult in the new process or machine. Should a type-setting contrivance, for instance, come into use, the printing-office would be the place where it would find employment, a practical compositor being the person selected to run it. Although many labor-saving implements have of late years been brought into use in the making of shoes, they have not hurt either the proprietors or the workmen, and so of most other mechanical pursuits; these novelties have been introduced so gradually or have conflicted so little with the old order of things that all have without much inconvenience or loss been able to accommodate themselves to the new conditions.

Then, too, it must be remembered that when commodities and articles of general use are cheapened, their consumption is in about the same ratio increased, thereby creating an additional demand for labor. When a suit of clothes costs but \$10, nearly one-third more will be worn out than when it costs \$15, hence the utility of the sewing machine.

Again, these scientific discoveries and labor-saving inventions serve very often to create entirely new industries, and such as without their intervention would never have had an existence; photography, the telegraph and the telephone furnishing examples in point. But for the introduction of the hydraulic method of gravel washing, the gold since obtained from this class of auriferous deposits would have remained where nature placed it, there being no other process by which it could have been profitably extracted. One hydraulic giant does the work of a hundred men, but it does not displace these hundred men, because in its absence there would have been none of this kind of work to be done. But for the invention of a machine capable of cheaply grinding certain woods to a proper degree of fineness, no pulp from this material would ever have been produced, to the great detriment of the paper-maker and all who use his wares. Through the aid of this ingenious contrivance the question of paper supply, once a cause of much anxiety to the manufacturer, has been relieved of its stringency.

Examples of similar purport might be adduced without number, and when Mr. David

Wells sees or affects to see in these labor-saving inventions only an agent of mischief, or, to use his own language, an evil, that has destroyed a very large proportion of the capital of civilized nations, and forced a majority of their industrial laborers to change of employment, increasing largely the number who, for the time being, are thrown out of employment altogether, it may well be suspected that his mental vision is somewhat awry.

If we are to believe what this writer and the disciples of the Henry George school tell us, our scientific discoveries and mechanical inventions, all these agencies for economizing labor and increasing production, are nothing but instrumentalities of evil, in that they destroy capital and augment the poverty of the working classes. According to the idea of these theorists, our boasted progress is retrogression; our civilization but another form of barbarism.

That advancement and culture, and even the highest enlightenment, develop certain evils, cannot be denied; but that they are of the kind or magnitude indicated by this class of publicists, no sane man will contend. Past experience disproves it—shows that human life has been prolonged and human happiness increased just in the proportion that this class of improvements has made progress.

The Richmond Consolidated.

The Richmond Consolidated Company of Eureka has not declared any dividends of late, because it has not been making any too much money, or rather because it has been spending a great deal for deadwork. They have been trying with rock drills to find ore in the lower levels of the mine and have not succeeded. None has been found below the 1050 level. They are now going to try on the Albion and Williamsburgh ground. At the same time they were making the borings they were also expending large sums in explorations on the upper levels of the mine. Deadwork and prospecting has cost the company about \$50,000 during the year. The furnace was only working 28 weeks out of 52 on account of lack of ore. The output for the year was 4562 ounces of gold, 174,856 ounces of silver and 878 tons of lead, which is worth at Eureka \$57,156. On that output they only made a profit on mining, smelting and refining of \$3758. The company has, however, undivided profits of \$74,000 on hand. They have been trying to find a good mine to buy, at or near Eureka, and have the money to pay for it if one is found to suit. A good many properties have been brought to the notice of Mr. Probert and the company, but the ores are not suitable for their purposes.

The reasons for the small profits made by the company during the past half year are thus enumerated by the chairman: "First, a serious diminution in the grade of the ore, which has fallen from \$46 per ton to \$39 per ton, a diminution of \$7 per ton, which, on the 4000 tons of Richmond ore which we have smelted during the year, would amount to \$28,000, or about 55000. Secondly, the failure of the ore body discovered between the 100 and 200 levels. If you will remember, a year ago we had just struck those bodies, and they promised exceedingly well. However, as we worked upon them they turned out only small in quantity, although very good in quality. Thirdly, there was the competition for the purchase of outside ore, on which little or no profit has been made, in consequence of the high price at which we have bought. You will see by the accounts during the year we expended over 20,000, in the purchase of these outside ores, and I believe we made little or no profit on them. The next has been the low price of silver. That has been a very serious item with us. I believe silver this year has been lower, for a long time, than ever it was known to be before. It is now only 3s. 6d. per ounce, and when I tell you that, even on the comparatively small quantity which we produced last year, 174,000 ounces, a decline of every 1d. per ounce makes a difference to us of 72500. a year profit, you will see of what importance this is to us. The fifth and last cause assigned is the non-discovery of ore in the lower levels of the mine."

THE Drumlummoo mine, Montana, crushed 7284 tons of ore last month, yielding \$71,500. The working expenses for the month were \$42,000.

Illustrations of the Russell Process.

(Continued from our last.)

F.—Siphon Pumps (or Ejectors), Solution and Sluicing Pumps.

The siphon pumps made by A. Aller, 109 Liberty street, New York, are lined with hard lead, and have a platinum steam nozzle. Size No. 4, costing \$58, is the most suitable for a 16-foot leaching-tank. In using the siphon pumps for leaching, two precautions are necessary: first, the siphon pump must be upside down (suction up) so that all solution coming from the leaching-tanks, running down the sloping hose, may fall directly into the steam in the ejector. Otherwise, or if the hose has a sag in it, the siphon will act only intermittently, ejecting first steam, then solution, then steam,

suction and discharge. The fire pump for sluicing should be a Knowles (or corresponding size of other make) single cap pattern with 10-inch steam and 5-inch water cylinder, 12-inch stroke and 4-inch suction and discharge.

G.—Apparatus for Mechanical Treatment of Sulphides.

This apparatus consists of a pressure-tank, Johnson filter press and steam drier. The details of steam drier are shown in Figs. 2 and 3. In the PRESS of August 4th was given the out of the pressure-tank.

If the sulphides are to be dried by steam, the use of the filter press cannot be avoided. Near the front of the steam drier is a small windlass by which the sulphides are lifted into or removed from the steam drier. At the side of the steam drier is the sampling floor and scales.

a thorough knowledge of the mining machinery used, and for this purpose he has visited Arizona, Nevada and Colorado. After a visit to Washington and the great copper mines in Michigan, he will return home by way of England, Germany and France.

When asked how many men he employed in his various mining operations, he replied: "About 20,000 men as laborers and 6000 in smelting works." He further stated that the copper mines are eight miles square. The common workman receives 50 cents a day, but the foreman and superintendent received salaries higher than is paid for similar work here. The heads of the various departments are generally Europeans, and they received from \$150 a month to \$6000 a year.

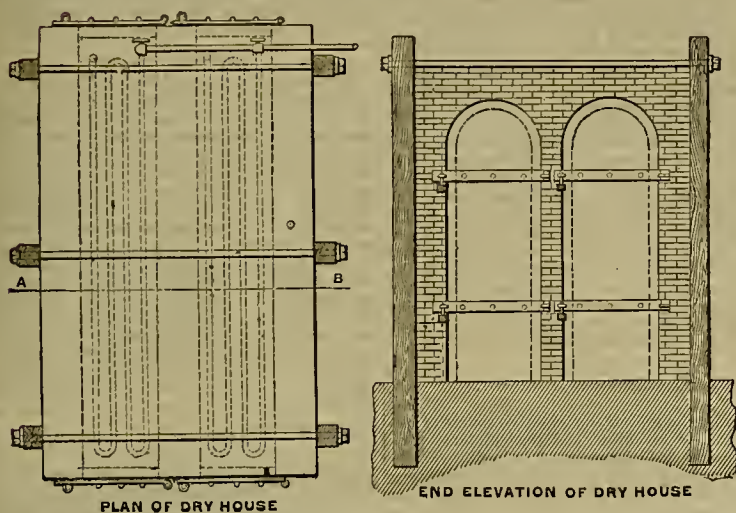
A Japanese official recently visited the coal

A Miners' Fund.

The "Miners' Fund," at the New Almsden quicksilver mine, Santa Clara county, in this State, was instituted for the benefit of the residents of New Almsden. The employees of the Quicksilver Mining Co., heads of families, and all other adults residing at New Almsden, each pay into this fund the sum of one dollar monthly. The money so contributed is held by the manager, J. B. Randol, as trustee, to be paid out for salaries of a resident physician and of a druggist, and for the purchase of medical supplies. It is also applied to the relief of contributors whose circumstances may require it. Contributors are entitled to medical attendance and medicines free for themselves and families. Not only do the miners and laboring men contribute

FIG. 2.

1 9 3 6 9 12



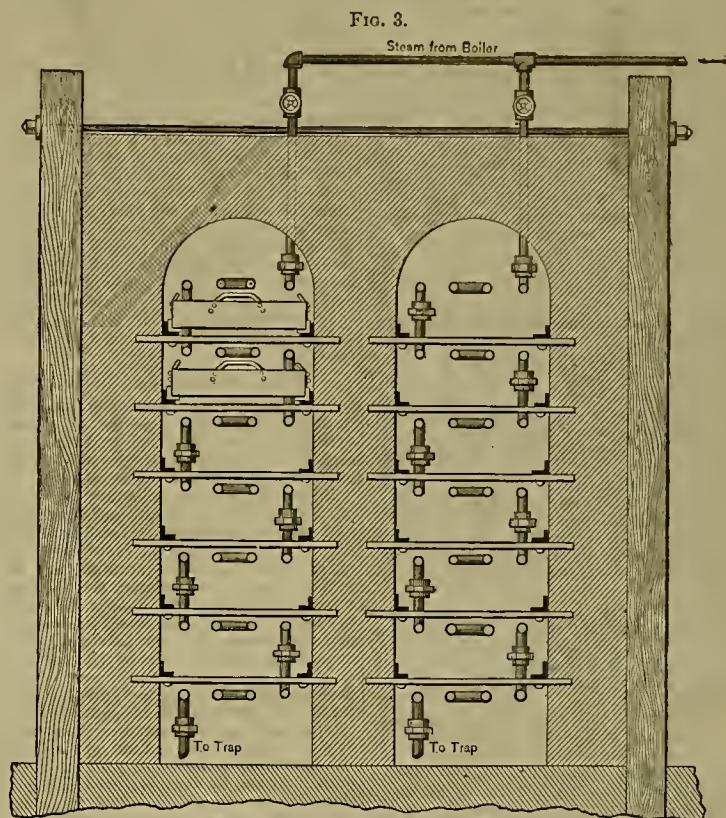
PLAN OF DRY HOUSE

END ELEVATION OF DRY HOUSE



SECTION OF DRY HOUSE DOOR

DETAILS OF DRY-HOUSE.



SECTION OF DRY HOUSE AT A-B.

1 9 3 6 9 12



PAN FOR SULPHIDE



CROSS SECTION

etc. Secondly, the steam used must be dry, which can only be secured in this case by covering the steam pipes. The difference in effect between wet and dry steam for siphon pumps was illustrated at a mill in Arizona. The steam was conducted about 200 feet in an uncovered 1½-inch pipe. The result was that the siphon pump would not lift six inches, and was, therefore, useless. It was then need near the boiler, and lifted 20 feet, and forced the solution an additional 20 feet.

In addition to one siphon pump for each leaching-tank, there is also one for returning the clear solution coming from the filter press to the pump of the solution pump.

If lead is to be precipitated with soda-ash, one siphon pump (which should be a No. 6) will also be necessary for each of the three lead precipitating-tanks. A siphon pump is also sometimes necessary in making up the extra solution in one of the storage-tanks; for, in case the chemicals in the box with perforated bottom should not be dissolved by the time the right volume of solution had run into the storage-tank through that box, some of that solution would have to be forced up and circulated through the chemical box until the chemicals were dissolved.

The solution pump should be a Knowles 6½ double plunger, with 8-inch steam cylinder, 5-inch plunger and 12-inch stroke, and a 4-inch

The sampling floor is best made of iron plates, the larger the better, closely joined.

Coal Mining in Japan.

Rich coal-fields are found in some parts of Japan, and especially in some of the minor islands. On the island of Kiusin there are four mines now being worked. On the island of Amakusa, to the west of Kiusin, there is anthracite. An extensive coal-field exists also in the neighborhood of Tokio. There are besides, in other localities, brown coal and lignite in abundance. The Japanese have begun to work some of these seams. The output amounted to 700,000 tons in 1881, but every year has seen a great increase. The German consul remarks that the Japanese use the best European machinery and follow the most approved methods of mining adopted on the continent. It might be worth while to bring machinery of American manufacture to the notice of the Japanese, who have lately bought largely in Germany.

R. Kondo of the Mining University of Japan is now on a visit of observation to the mines of this country and Mexico. He has visited many of the gold mines of this State. Mr. Kondo is reported to be the wealthiest man in Japan, outside of the Royal family. He operates 16 different mines of gold, silver and copper in his own country. His principal desire is to obtain

and coke regions of Pennsylvania. The Connellsville Courier speaks of him as follows: "He was a high-up Japanese official, but in this democratic country his titles are dropped and he is plain Mr. T. Dan. He was sent abroad by his Government to inspect the English and American systems of coal mining and coking, and to report as to the best means of working an excellent vein of nine-foot coal underlying a large tract of Japanese territory, which is about to be developed by native capitalists, encouraged and assisted by their progressive Government. Mr. Dan is now on his way home, having spent some time in England and this country. He came to Connellsville from the anthracite region, where he had been the guest of Eckley B. Cox, the well-known coal operator in that section. During his stay here he was shown around by the superintendent of the Connellsville Coke and Iron Company. Mr. Dan, in the course of conversation, said: 'Our coal in Japan resembles yours here in the Connellsville region, though perhaps a trifle harder. We have already tested its coking qualities and find that it makes fair coke, suitable for our purposes. We use it in the foundries and the mills. As yet we do not manufacture raw iron in Japan. The coal lies about 400 feet below the surface and is being reached by a shaft, the machinery for which I purchased in America.'"

the dollar each month, but the manager himself and all the officers do the same. The company provides the physician's house and office and the dispensaries.

The fund is also used for the relief of the indigent poor, and when men are hurt in the mine. When they are wounded or injured at the mine, if they are not able to pay their board, it is paid out of this fund, and all their supplies are also furnished. It also furnishes two hospitals for those who are injured in the mine. One of these is in the Mexican camp and the other in the English camp on the hill. There is generally from \$8000 to \$10,000 in the bank to the credit of this fund. Upward of \$100,000 has been collected and disbursed since the fund was started.

In a serious riot between Italian and Hungarian laborers at Sawyerville, Canada, nine Italian and one Hungarian were killed and 40 wounded. The militia of Sherbrooke and Montreal have been ordered to the scene.

A VALUABLE discovery of gray copper is reported from the Salmon river, Idaho, mining country. One lode, 18 feet in width, attracts attention.

It is feared that Stanley, the African explorer, has met his death at the hands of the natives.

MECHANICAL PROGRESS.

The Bessemer Process an American Invention.

A Brief History of the Discovery—How Mr. Bessemer Got Hold of it from the American Inventor.

We find the following succinct but very complete and interesting history of the Bessemer invention in a late issue of the *Blacksmith and Wheelwright*. It is well worthy of perusal and should be read and preserved by every one interested in American inventions. The fact that Mr. Bessemer was obliged to divide his interest with Mr. Kelly is ample proof of the truth of his claim. The poverty of the inventor and the lack of a due appreciation of his invention by his wealthy friends, lost to him and his country the full title and name of the most important and valuable invention ever made.

The late William Kelly of Louisville, Ky., was one of the pioneer furnacemen of Kentucky. He and his brother operated for many years the Germinie furnace near Eddyville and the Sewanee furnace, near Kuttawa. While experimenting he conceived that the refining of the metal—that is, the converting of cast iron into malleable iron—could be accomplished with the oxygen of the air. With great faith in this idea, at heavy expense, he constructed as well as he could with the means at hand an apparatus for blowing blasts of heated air into the molten metal while it remained in the hearth or oven in which it had been melted from the crude ore. At first a number of experiments resulted in disappointments, owing entirely to the imperfection of his blowing or blast apparatus, but his great confidence in his theory impelled him to try again. "About this time," says a Paducah (Ky.) editor, "two Englishmen, who were experts in smelting and refining iron, arrived at his works and were given employment. With the assistance of these men Mr. Kelly made a 'more perfect' blast or blowing cylinder, and after making a dozen or more experiments he exclaimed 'Eureka!' and immediately sent invitations to a number of his friends to come to his works and witness the wonder of making horseshoes out of iron taken from the hearth or oven of a common blast or smelting furnace.

"Many went at the appointed time, more out of respect to Mr. Kelly's invitation than from a faith in seeing him demonstrate that he had discovered what Judge Kelley of Pennsylvania has since termed the 'greatest invention of the age.'

"The writer of this, then a small lad, went on that occasion with his father, and remembers well to have seen a brawny blacksmith take from the seething oven of the Sewanee furnace a quantity of molten or liquid iron to his shop, and after permitting it to somewhat cool, he placed it on his anvil, and with the merry ring of his hammer produced and threw down at the feet of the amazed spectators in 20 minutes a perfect horseshoe. Then he got more of the liquid iron, made some nails, and with those he fastened the shoe he had just before made to the foot of a horse belonging to one of the invited witnesses.

"Mr. Kelly had expended vast sums of money in his experiments, which embarrassed his firm, and in three months after his grand discovery it made an assignment and all work was stopped. The two Englishmen who had assisted him returned at once to England, and soon found employment at a furnace at which Mr. Bessemer was then, and had been for some time, trying to work out the same problem which Mr. Kelly had a few months before solved. Of course these workmen imparted to Mr. Bessemer the secrets of Mr. Kelly's discovery. Mr. Bessemer without delay adopted Kelly's methods and obtained the same results. Bessemer was then rich, Kelly was poor. Bessemer at once applied for a patent in England, at the same time filed a caveat for one at Washington. Kelly also applied at Washington for a patent about the same time. A lawsuit ensued between the two claimants and resulted in a compromise by which Mr. Kelly got only a small per cent of the royalty on the patent in this country. Had it not been for Mr. Bessemer's wealthy backers, Mr. Kelly would have won the suit and enjoyed the full benefits and blessings of his grand discovery, to which he was justly entitled."

NEW PROCESS FOR WIRE MANUFACTURE.—It is said that Mr. H. A. Williams of the Williams Manufacturing Co. of Taunton, Mass., has invented a machine for cheapening and improving steel or iron wire, which is calculated to make a change in many branches of industry in which iron, steel, copper and brass wire are used. The invention, which has just been patented, consists of a series of rolls in a continuous train, geared with a common driver, each pair of rolls having a greater speed than the pair preceding it, with an intervening friction clutch adapted to graduate the speed of the rolls to the speed of the wire in process of rolling. The entire process of manufacturing the smallest-sized wires from rods of one-half inch in size cold. The new process obviates the danger of unequal annealing, and of burning in the furnaces, and the wire is claimed to be more flexible and homogeneous than that produced by the common

processes, and capable of sustaining greater longitudinal strain. It is, therefore, specially adapted for screws, nails, cables, pianofortes, and many other uses; and copper wire made by this process is claimed to be possessed of greatly increased electrical conductivity. A new corporation, called the Williams Wire Machine Co., will be formed to manufacture the machines at Taunton.

Lead Pipe—How It Is Made and Used.

One of the most useful inventions of modern times, and one of the most common, is lead pipe, yet there are but few people who have even an idea how it is made. Ask the question and nine out of ten will reply that the lead is poured around a hole. The other will confess that he does not know. The process, however, is exceedingly simple. It is made in an upright press, and by hydraulic pressure the lead, when it is just hard enough to keep its shape, is squeezed out through a hole and around a core. Two upright stanchions support the top piece of the press and from that piece a heavy cylinder hangs down. There is a hole in the cylinder, the size the pipe is to be on the outside. Immediately below this cylinder is another, which is hollow, and in the center of it is a rod of iron which forms the core. The molten lead is poured into this hollow cylinder, and when it has hardened sufficiently a hydraulic pressure of 250 pounds to the square inch is applied from below. The hollow cylinder rises, and as it does the rod in the center moves into the center of the hole in the upper cylinder, forming the mold. As the lower one rises it fits around the upper, which presses so hard on the lead that it is forced through the hole and around the cover, and it comes out of the top as paint does out of a tube of colors when it is squeezed at the bottom, but it is lead pipe then and it is coiled up, and as soon as it is cool it is ready for use.

The manifold Uses of Lead Pipe.

The increasing requirements of modern civilization are well illustrated by the extent and variety of the uses to which lead pipe are put, especially in our large cities. Some of these uses have been enumerated as follows:

Pipes for conveying and delivering illuminating gas; pipes for conveying and delivering fuel gas; pipes for conveying and delivering drinking-water and for fire purposes; pipes for conveying salt water for street sprinkling and for fire purposes; pipes for draining and carrying off sewage and surface water; pipes for delivering hot water under high pressure, for heating purposes and power; pipes for delivering cold water under high pressure, for power; pipes for delivering live steam under pressure, for heating purposes and power; pipes for delivering compressed air, for purposes of power and ventilation; pipes for producing power where required, by vacuum or suction, and for ventilation; pipes for conveying letters and packages, by compressed air and by vacuum; pipes for regulating clocks by compressed air; pipes for conveying mineral oils; pipes for electrical wires for electric lighting, electric railways, telephones and telegraphy, and pipes for power ropes for driving machinery and moving street-railway cars.

HINTS ON WORKING STEEL.—The well-known steel-makers, Miller, Metcalf & Parkin of Pittsburgh, Pa., have recently issued a card designed for steel-workers who order steel, which contains several valuable hints, as follows: Don't forget to specify the purpose for which steel ordered is to be used. You have no idea how much more likely you are to get just what you want by doing this. Don't forget that the grain of a well-hardened and broken piece of steel is much finer than that of the bar it was taken from. If the grain is as coarse as, or coarser than, the original bar, the heat need (whatever it may have been) was too high to refine the steel in hardening. Don't decide the quality of any bar of steel by the appearance of its grain. The coarseness or fineness depends much more on the heat at which it left the hammer or rolls than on its quality. Don't try to harden any bar of steel without first removing the scale from it. You will certainly be disappointed if you do, as the outside is likely to be soft enough to file easily. Don't try to harden large tools in a small bath or still water.

RIFLING GUN BARRELS.—By means of recent improvements made in the manufacture of rifles, as many as 120 barrels can now be rolled in an hour by one machine. They are straightened cold, and bored with corresponding speed, and even the rifling is done automatically, so that one man tending six machines can turn out 60 or 70 barrels per day. With the old rifling machine 20 barrels were about the limit of a day's work; but the improved machines attend to everything after being once started, and when the rifling is completed, ring a bell to call the attention of the workman.

THE PROGRESS OF THE AIR BRAKE.—Eighteen years ago, when the air brake was tried, it required 18 seconds to apply it to a train 2000 feet long. Four years later the time was reduced four seconds. Recent experiments with the air brake on freight trains show that it can be applied to every car on a train of that length running at the rate of 40 miles an hour, and that this train can be stopped within 500 feet, or one-fourth of its own length, and all this without any serious jolting.

SCIENTIFIC PROGRESS.

Magnetic Force Acts Through Every Known Substance.

In reply to a correspondent who asserts that magnetic force will not act across a screen of iron or other magnetic substance, as nickel, cobalt and a few other substances, and for proof thereof refers to "Elementary Lessons on Electricity and Magnetism," by Silvanus Thompson, p. 77, the editor of the *American Machinist* says:

The statement in the book to which our correspondent refers says that a "magnet enclosed in a hollow sphere of iron is unaffected by outside magnetic influences." This, however, is not due to the iron being an insulating substance at all, because it is not an insulating substance. Two magnets, between which a sheet of iron is interposed, still attract each other, and will do so through any known substance, through a flame, through any known gas or through a vacuum. The fact that a sphere of iron acts in this way seems to be due to a balancing or absorption of the magnetic force, due to the form in which the metal is disposed rather than to the character of the metal itself—a fact which seems plainly demonstrated when we consider that if the half of the sphere furthest from the outer magnetic force be removed, the force will act through the other half.

It will be seen from this that in the sense in which the original question was meant, our answer was correct. Numerous individuals have thought that they could produce perpetual motion by mounting two permanent magnets at the ends of levers, in such a way as to be attracted toward each other, and by their movement cause a thin sheet of insulating material to be interposed, thus cutting off the attraction, and causing the magnets to recede from each other by the action of gravity, or of a spring; this action in its turn removing the insulator, and allowing the magnets to again attract each other; thus producing a motion which would go on indefinitely, without the expenditure of external forces. Among all the many schemes to produce perpetual motion, this, perhaps, seems, upon the face of it, to be the most feasible. But, as if Nature deliberately calculated to defeat every plan to produce such a motion, she fails to furnish the required insulating substance; at least it never has been, and we believe never will be, discovered.

Making Gas from Oil.

This has long been an attractive source of experiment for inventors, and the opinions as to its practical value appear to be quite varied. The *New York Mail and Express*, in alluding to this matter, recently furnished some facts and suggestions which may have a value to those who are engaged in this investigation. We copy as follows:

"Of the many devices employed in the manufacture of illuminating gas, none has seemed more attractive to inventors and manufacturers than the use of petroleum oil in place of coal. Some very considerable advantages seem possible by its use, and although it was pretty thoroughly tried a number of years ago and generally discarded, the question of substituting it for coal has been revived and is again receiving considerable attention.

"There is no question that the gas which can be readily enough made from the oil is very highly luminous, and this is an apparent advantage. But there are other considerations, and the first of them is the cost. It seems as though it ought to be cheaper than coal, unless at a time when coal is unusually cheap. The gas from oil is called of 60-candle power, but it is exceedingly doubtful whether it can be made to maintain that standard when stored or delivered in the usual manner to towns or cities.

"Even if it can be 60 candle gas, as it is ordinarily used, it is not worth twice as much as 30-candle or three times as much as 20-candle gas. The greater pressures at which the higher qualities have to be consumed in order to get the best results eject the hydrocarbon particles from the burner at such a rapid rate that many of them are wasted and not burned at all.

"There have been many devices for securing the greatest light from the burning of a given amount of gas, but most of the inventors start wrong. They use small burners and high pressure. When the quality of gas is stated as of such a candle-power, it can only be compared with other gas that is used through a standard burner by testing it with the same burner."

WHERE WILL DISCOVERY CEASE?—Whether all science has limits, so that at the present rate of progress all discoverable things may have become known a few generations hence, is a question that must have been suggested to many. Concerning the future of systematic chemistry, Dr. Edward Schunk has concluded that in the course of time this prolific field of to-day will be worked out. All possible compounds—or nearly all—will have been prepared, all the most important chemical facts will have been discovered, and pure chemistry will be practically exhausted, and have arrived at the same condition as systematic botany and mineralogy now are, with only rarely a new plant or mineral to be determined. Chemical science will not cease there, however, for, as

the botanist is still fully employed in investigations in plant physiology, so will the chemist find opportunities—probably far beyond our present conception—for research in such investigations as those of the processes by which organic compounds are produced in the growth and decay of plants and animals.

A GOOD WORD FOR THE ENGLISH SPARROWS.—When so much has been said against that now familiar bird, the English sparrow, we are constrained to give circulation on this coast to the following little word in his favor, which is taken from a recent number of the *Ogdenburg, N. Y., Journal*: Spare the sparrows, for they sometimes do valiant service in destroying destructive worms. The army worm has done a great deal of damage to the oats and corn in this vicinity the past spring. Charles Dubois was obliged to resow a 5-acre patch of oats and 3 acres of corn—the first planting having been destroyed by the army worm. While discussing the subject with his neighbor, John Paul, during the prevalence of the worm, Paul, who is a very observing man, called the attention of Mr. Dubois to the operations of a few sparrows which came into the field and gorged themselves on the army worm, and took hundreds to their young. He remarked to Mr. Dubois: "See there!" pointing to a sparrow, "you need not talk to me any more about shooting sparrows, for I am convinced that they do more good than harm. That bird had his mouth full of worms that have been destroying the oats." The bird flew away to feed its young and then came back. Mr. Paul again called attention to him. "See there!" said he to Mr. Dubois, "he is back after more." Mr. Dubois is now satisfied that the sparrow is worth more than he costs.

UNDER THE OCEAN WAVES.—There is very good reason to believe that it will not be long before we shall know almost as much about the topography of the bottom of the ocean as we now do of its surface. This will be brought about by means of the photographic camera, experiments with which are now being made. Thus far the best results have been obtained by the Swedish Government, which, however, have not been of any real value to science, except to open up the possibilities for the future. Most of the plates display simply a tangled mass of vegetable growth, as if the camera had been put into a thick lot of underbrush and the plates had been exposed. Still the comparatively unsatisfactory result is encouraging, and leads all scientific men to believe that before many years the floor of the ocean will not be an unknown land, as it in reality is at the present time.

ACTION OF ELECTRICITY ON ALBUMEN AND ALCOHOL.—Recent experiments in Italy give some facts which prove conclusively that a weak but continuous current of electricity through wine causes a deposit of aluminous substances, diminishes slightly the amount of alcohol, which latter is accounted for by increase of acetic acid. It gives to the wine the bouquet which is otherwise only acquired by age, and, without doubt, aids in the keeping qualities of the wine. There is a hope expressed that in time there may be a method found by which sterilization will be accomplished by electricity. The above has reference, no doubt, to the Fraser wine process, which has recently been experimented upon in various parts of Europe with the most encouraging results.

TRACES OF AN OCEAN EARTHQUAKE.—On the 16th inst. Superintendent Thorn of the United States Coast and Geodetic Survey was notified by Prof. George Davidson that the Sancelito self-registering tide-gauge on Friday commenced recording the traces of an earthquake as transmitted through the Pacific ocean. They continued until the next day at noon. Although irregular and not very large, there was yet no mistaking their character. If the earthquake was felt on the eastern coast of Asia or in any of the Pacific islands, we shall hear of it, but if it took place in mid-ocean the silent register at Sancelito will be its only direct record.

THE GREAT CLIMATIC CYCLE.—According to the calculations of M. Adolphe d'Assier, based on the assumption that the coincidence of the earth's perihelion passage with the summer solstice every 21,000 years marks the regular recurrence of a northern glacial period, the last glacial period culminated in 9250 B. C., the alternating period of greatest northern warmth occurred A. D. 1250, and the ice period now approaching will reach its greatest height A. D. 11,750. Evidence of the slow cooling during the past 600 years is seen in the changes recorded in the northern limits of the growth and ripening of certain fruits.

THE BRAIN OF THE CHIMPANZEE.—It has been found that the essential characteristics of the brain of the New York chimpanzee, familiarly known as Mr. Crowley, were human. Its weight was about a third of that of a human brain of ordinary development, and it indicated that the chimpanzee knew more than some idiots. Not many men have enjoyed so much fame as did Mr. Crowley. His gifts were numerous, and the poems and prose written in his honor were many. So much fame was too much for his brain and he was inclined to be savage.

USEFUL INFORMATION.

Floating Soap and Javelle Water.

It is a mistaken notion that there is any special magic in floating soap or soap powder, rendering them more efficient than other soaps. Floating soap may be made by any one, with no other ingredients than ordinary oil soap and water, and made to make double the bulk and weight of ordinary soap, but the product is only half as efficient as at first.

One hundred pounds of soap and a gallon of water melted and thoroughly agitated together till the mass is at least double the volume, then put in the frames, and cut and pressed when cooled.

Soap powders are dangerous because of the carelessness of servants; putting too large a quantity or putting them upon the clothes instead of first dissolving them. They are nothing but a little soap and a good deal of carbonate of soda. If carbonate of soda is wanted, obtain it at half the cost of soap powders and dissolve in water as desired, and add what soap is wanted.

The practice of using javelle water is another dangerous operation, and very many persons who wonder at the holes in their clothes, the spots on calico, and the quick decay of their garments, may readily find cause in these preparations.

Javelle water is made of caustic soda, one pound, and chloride of lime, one pound, dissolved in a gallon of warm water. A very small quantity of this will destroy any fabric, although at the same time perfectly bleaching it. But it is the want of caution which causes the injury.

HOW HE BEAT THE AUTOMATIC WEIGHER.—A New York paper says: A man, his wife and three children walked up to one of the drop-penny-in-the-slot-and-asertain-your-correct-weight machines in one of the North river ferry-houses, and after examining told his three children to step on the platform of the scale, which they did. He then dropped a cent in the slot and the hand moved around to 203. He then told the largest child to step off, and as soon as he did the hand moved back to 113; thus, by subtracting 113 from 203 he ascertained the weight of the child. In this manner he also ascertained the respective weights of the two other children. His wife and himself got on the scales and weighed in a like manner. He saved three cents.

HOW TO MAKE GROUND GLASS.—A correspondent of the *Scientific American* gives the following process by which he has made ground glass: "I first bought five cents' worth of emery and two plates of glass the size required. Spoiled negatives will answer if they are cleaned, which can be done with a strong solution of lye. I placed one of the glasses on a flat board and sprinkled a small quantity of emery on it, which I wet with water. Placing the other glass on that, I ground them together, renewing the emery and water whenever necessary. In about one hour I had two of the finest quality of ground glass, fully as good as those I would have to pay 75 cents for (8x10 size)."

A CANDLE AND A GAS EXTINGUISHER.—A new candle has been brought out which extinguishes itself in an hour. This is done by means of a tiny extinguisher of tin which is fastened in the wax by wires, and which effectually performs its task. It is only necessary to remove this diminutive extinguisher when its work is done, and the candle is again ready to burn another hour. An automatic gas extinguisher has lately been patented by Joseph Haroux of Yamachiche, Canada, which consists of a spring stop-cock, which shuts automatically when the gas is extinguished. The mechanism used is based on the lateral expansion of metals.

"SIZES" OF COMMON THINGS.—"It is astonishing to observe how few people understand the common rule of measurement in purchasing wearing apparel," said a clothing dealer. "For instance, a man will buy a coat that is a 'size' too small or too large. A 'size' smaller or a 'size' larger is what he probably needs, but he does not know what a 'size' is. Well, a 'size' in a coat is an inch, a size in underwear is two inches, a size in a sock is one-half inch, in a collar one-half inch, in a shirt one-half inch, in shoes one-sixth inch, pants one inch, gloves one-fourth inch, and in hats one-eighth inch. Very few purchasers ever understand the schedule named."

THE FLIGHT OF PIGEONS AND BEES.—The owner of some homing pigeons at Hamm bet that on a fine day 12 of his bees would heat a like number of carrier pigeons in making the distance (one hour) between Hamm and the town of Rhyner. Twelve pigeons and 12 bees (four drones and eight working bees, all powdered with flour) were taken to Rhyner and simultaneously set free. A white drone arrived home four seconds in advance of the first pigeon; the remaining three drones and the second pigeon arrived together, and the eighth working bee preceded the ten pigeons by a length.

WHAT IS A SLEEPER?—A sleeper is one who sleeps. A sleeper is that in which the sleeper sleeps. A sleeper is that on which the sleeper

sleeps while the sleeper sleeps. Therefore, while the sleeper sleeps in the sleeper the sleeper carries the sleeper over the sleeper under the sleeper until the sleeper which carries the sleeper jumps the sleeper and wakes the sleeper in the sleeper by striking the sleeper under the sleeper, on the sleeper, and there is no longer any sleeper sleeping in the sleeper on the sleeper.

PAPER GUNPOWDER.—At the Royal powder factory of Wetteren, in Belgium, a new gunpowder is being made. They call it pondrapapier, or paper powder, and it is said that a charge of 2½ grammes (39 grains) gives, in a rifle of small caliber, an initial velocity of 660 yards to the ball. This is equal to, if it does not beat, the Nobel powder. The additional advantages are attributed to it of not smearing the barrel, of producing no smoke and of causing little recoil.

NATURAL SOAP WELL.—A natural soap well has been discovered near Buffalo Gap in Dakota. The soap is skimmed from a boiling spring, and hardens by exposure to the air. It is like soft clay, and can be gathered with a shovel. It is supposed to be a mixture of borax, alkali, and lubricating oil. The quality is excellent, and the supply is believed to be inexhaustible.

INDIANS AND THEIR INDUSTRIES.—Indians in the United States last year cultivated 227,265 acres of land, and raised 724,928 bushels of wheat, 934,972 bushels of corn, 512,137 bushels of oats and barley, 524,010 bushels of vegetables, and 101,825 tons of hay. They also owned 358,334 horses and mules, 111,407 head of cattle, 40,471 swine and 1,117,273 sheep.

THE BEE INDUSTRY.—According to the *Bee Journal*, there are in North America about 300,000 persons keeping bees. The annual honey product is about 100,000,000 pounds, and its value nearly \$15,000,000. The annual wax product is about 500,000 pounds, and its value more than \$100,000.

THE OX AND DOG IN CHINA.—It is not generally known that in China it is a less crime to steal an ox than to steal a dog. The former is simply personal property, but the latter takes the place of a man—a watchman. And quite right, too.

A NOTED HORSESHOE.—A Dayton (Ohio) blacksmith has made a horseshoe from nails gathered from every State in the Union and presented it to the President.

GOOD HEALTH.

The Sightseer's Headache.

Of the lighter penalties which pleasure entails, none probably is more widely known and felt or more persistently endured than the sightseer's headache. It is nature's tax levied on the comfort of that great body of busy idlers to which we all at some time or other belong. It is endemic among the frequenters of museums, picture galleries and exhibitions. The very general prevalence of this variety of headache, and its independence in many instances of any vitiation of atmosphere, teach us to look for its explanation in other causes. The effort of mind implied in long-continued observation, even though this does not involve the strain of study, has probably an appreciable, though a secondary, influence.

Fatigue certainly has an important share in its production; but it is with most persons rather fatigue of muscle than of brain. The maintenance of the upright posture during several hours of languid locomotion, the varied and frequent movements of the head, commonly in an upward direction, and the similar and equal restlessness of eyes whose focus of vision shifts at every turn as a new object presents itself, form a combined series of forces more powerful in this respect than the sunlight and frequent changes of mental interest and attention by which they are accompanied. The muscular strain implied in these movements is necessarily very considerable. It affects more or less every member of the body, but the distant localization of the resulting ache has probably much to do with the unusual activity of the cervical extensor and rotator muscles, and of the muscles which move the eyeball. Whatever the minor influences at work, therefore, there can be little doubt that mere fatigue is primarily accountable for this most general form of headache, and that rest and nourishment are most reliable antidotes.

The utility of stimulants for this purpose is necessarily temporary and deceptive. One improvement on existing arrangements ought to be of real assistance to the suffering sightseer, if more generally introduced by responsible authorities. The comparative scarcity of seats in many places of amusement has often been noticed. It would be much to the public advantage if this want were supplied. For the attendants at exhibition stalls a chair for occasional use is an absolute necessity.—*Eastern Exchange.*

DANGER IN FILTERS.—There is much danger in filters which are not properly cared for. A filter that cannot be washed clean every day ought not to be used. The reason is given as follows by the St. Louis *Globe-Democrat*: A most astounding revelation has come to those

who have been confidently trusting to appliances for purifying their drinking water. It seems that the ordinary filter, instead of rendering the water pure and safe, is actually the means of producing just the opposite result. The Rhode Island Medical Society, through Dr. Swarts, shows that some filters when first need do remove a proportion of disease germs. But after being in use only a few days there is a marked increase in the number of colonies of germs in the filtered, as compared with the unfiltered water. In one instance the unfiltered water showed the presence of 36 colonies, while the filtered contained the enormous number of 2000, 3000, 9000, and even more. That is, the poison caught up by the filter the first few days becomes a source of a vast multiplication of the dangerous element. So look to your precautions and then be on your guard. If you cannot constantly cleanse your filters, you had better destroy them.

ELECTRICITY AS A PAIN-KILLER.—There seems to be no limit to the useful applications of electricity. Mayor Hewitt was not far wrong in his late assertion before the Electric Convention in New York, that "electricity was only in its infancy." The latest application is noted by the *New York Mail*, which describes a novel experiment recently made by a dentist in that city. The *Mail* says: "A lady who went through the trying ordeal is responsible for saying that a dentist in this city has successfully introduced electricity as a substitute for gas. She went to him the other day to have a tooth filled, and as she feared to take gas, anticipated martyrdom. The dentist asked her if she would not try electricity, and his explanation satisfied her of its painlessness and safety. The dentist had a small battery with which he charged her, and when he placed the forceps to the tooth to be pulled, the instrument acted as a conductor of the electric fluid which flowed from the tooth. When he pulled she felt no pain, the electricity seeming to neutralize it, as if gas had been administered. The patient besides felt exhilarated and strengthened by the operation. There seems to be no longer any reason why the filling and pulling of teeth should be accompanied with such fearful dread and subsequent agony." If electricity is thus effective in tooth-pulling, why not in ordinary surgical operations? Are we on the eve of a substitute for the dangerous and exhausting use of anesthetics in surgery?

IODINE FOR ANT STINGS.—Edward Hyatt writes the San Jacinto *Register* as follows: "Only those who have been stung know how to appreciate the misery of the 'harefoot boy with cheek of tan' who has stepped on a red ant. Little children will sometimes cry for three hours from a single sting. I have tried camphor, liniments without number, ammonia, soda, alcohol (externally used), and everything else that the fertile imagination of numerous friends could suggest, without obtaining the slightest relief. Happening one day to rub a drop of iodine upon a fresh sting, I was surprised to find that the pain at once ceased. Since then numerous trials have shown that it is a good thing. Ten cents' worth of iodine from the nearest city drug store will save \$10 worth of pain in a very short time. If the stains of the iodine are objected to, the discolored variety may be obtained."

AN ELECTRIC DISEASE.—What has been called "electric prostration" seems to be a new disease which troubles workers under electric light. Severe cases are reported from Creusot, France, where an electric current is used for quickly heating metals. The light exceeds 100,000-candle power, and the men suffer from it, not from the heat. After one or two hours the workers have a painful sensation in the throat, face and temples, the skin becomes copper red, and an eye irritation begins that lasts 48 hours, the discharge of tears being copious. After five days the skin peels off. Dark colored glasses somewhat mitigate the effects of this tremendous light, but not entirely.

SWEAT GLANDS.—The number of sweat glands in a man has been estimated at 2,300,000. It has been calculated that a healthy adult man loses by the skin two pounds daily; a horse weighing 800-weight loses 14 pounds 5 ounces, and some small animals, such as the guinea-pig, as much as one-twelfth of the weight of their bodies. The watery vapor thus excreted contains five parts in 1000 of solids.

MEDICAL PROPERTIES OF EMMENSITE.—In an address before the Lehigh Valley Medical Association at Easton, Pa., on the 15th inst., Dr. Benjamin Lee of the State Board of Health stated that the new explosive, emmensite, when inhaled through the nostrils, will check a cold in the head, and if taken internally it is a febrifuge, and is useful in malaria.

TO REMOVE TARTAR FROM THE TEETH.—Should any little incrustation (tartar) appear on the sides or at the back of the teeth, which illness and very often the constant eating of sweetmeats, fruit and dishes containing acids will cause, put a little magnesia on your brush, and after a few applications it will remove it.

DANGER FROM HEMLOCK BOUGHS.—Bernard and Joseph Molloy, at Consett, England, sucked the ends of fresh hemlock twice a few days ago, and died in a short time. The doctors decided that hemlock was a virulent poison in the spring season.

ENGINEERING NOTES.

The Panama Canal.

This great work seems to afford an endless theme for discussion, speculation and peonulation. The facts that have been set forth with every reasonable presumption of correctness, reveal the most colossal incompetency or culpability of those who have the work directly in charge. How it is going to end only the fullness of time can reveal.

The latest financial scheme—the lottery enterprise—though apparently successful, does not appear to be so in reality. The *Economiste Française*, an eminent home authority, says it has proved a partial failure—of the total amount subscribed, no less than \$4,000,000 will be absorbed by the Government deposit required to guarantee the yearly drawings for redemption of loan, and by the immediate requirements of the company for interest. The amount left for the immediate continuance of the work is a sum altogether insufficient to secure any considerable progress, leaving out the matter of its final completion.

In the meantime, M. De Lesseps continues to promise the opening of the canal in 1890, in spite of the fact that it is now well known that this would be utterly impossible, even had the company abundance of means at its command. It is evident, indeed, that a crisis is fast approaching, and that a suspension of work, if not a total collapse of the company, is among the probabilities of the immediate future.

But little progress has been made since the report of Mr. Roudier, who said: "The only portion of the canal so far open to navigation, and that only for light-draft boats, is that portion from Colon to Gatun, which has been done by the American Dredging Company. This portion has been dredged to the depth of six meters out of the necessary 15. The other portions of the vast work are so little developed that it is impossible for any living man to make anything but a guess at the possibilities of completion. It is generally reckoned that the Culebra alone will take five years of hard and intermittent work. It is only by continual watching that landslides are to be avoided, and there is no doubt that if the works were to be abandoned for any period of time, through lack of funds or other reasons, the result would be most disastrous."

The lottery scheme is still denounced in Paris as a masterpiece of charlatanism; a dragging of the scheme into French politics, at a time when the Government most readily could be hectoring into giving its managers the necessary authority to delude their trustful countrymen into subscribing more hundreds of millions to go the way of those that have preceded them.

THE PROJECTED RAILROAD ACROSS ASIA MINOR.—The consular reports lately issued by the English Government include a paper which presents some interesting details relative to the projected railway from Scutari, the Asiatic suburb of Constantinople, to Bagdad on the Tigris. In August last an imperial order was issued sanctioning the construction of the proposed line by a syndicate of English financiers. A French company, in favor of adopting a narrow-gauge system, also made a bid for the contract, but the Sultan decided for the British competitors and for a wide-gauge road. It is estimated that the line can be built at a cost of \$77,500,000. Its length is 1400 miles, or more than 100 miles greater than that of all the present Turkish railway systems, European and Asiatic combined. Once in successful operation, the road will create a new Asia Minor, open to the trade of the world a wide territory now closed, totally change the character of the country, and practically advance Turkey in Asia from, say the sixteenth to the nineteenth century. Navigation from Bagdad, the terminus on the Tigris, to the Persian Gulf, is easy. A new through highway to the East, independent of the Suez canal, will thus be open, which will bring Europe nine or ten days nearer to India than it is now.

CHINESE CANALS.—The early canals of China, although destitute of locks, do not appear to have been on that account formed on a uniformly level line, unadapted to varying heights. It is very doubtful, indeed, if the use of locks has even yet been introduced into China, intersected as it is by many canals of great antiquity and extent, the Imperial canal being about 1000 miles in length. This canal appears to have been completed in 1289, and is said to extend for a distance of 40 days' navigation, and is provided with many sluices, and when vessels arrive at these sluices they are hoisted by means of machinery, whatever be their size, and let down on the other side into the water.

THE POUCHKEEPSIE BRIDGE.—The last span of the great Poughkeepsie bridge across the Hudson was completed August 30th. Railway connection between the New York and New England systems is being pushed by the construction of a short link of road on each side of the bridge, and it will not be long before this important structure will be in use, materially shortening the distance from Boston and other New England points to the Pennsylvania coal-fields and to many portions of the country farther west.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH CON.—Amador Ledger, Sept. 22: Nothing has been done toward reopening the Plymouth Con. It is now said that there is no water to be had for running the hoisting works, and that there is no hope of getting water until the winter rains set in and furnish an increased supply for the canal. This is not probable before the latter part of November.

AMADOR GOLD MINE.—Connection was made on Wednesday between the north and south shafts, 300 feet apart, at a depth of 250 feet. The drift on the north has been run 35 feet, the rich ore streak heretofore spoken of continuing unbroken. The west drift, in the direction of the main ledge, shows a large ore body, with a fine black gouge. This vein is thought to be of paying grade throughout, although no free gold is visible to the naked eye. It is no doubt identical with the ledge found in the Amador Queen and Doyle mines, in Hunt's gulch. The framing of timbers for the mill is progressing rapidly—in fact as fast as the lumber is being received. The running expense of the mine last month reached the sum of \$9500.

MISCELLANEOUS.—The 10-stamp mill is all on the ground at the Reed & Askey claim, near Irish Town. It will be put together as fast as possible, and in three weeks more it is expected to have it in operation. The North Star has developed no change worthy of note. There is quite an increase in the flow of water in the drift which is being run east, and this is taken as a favorable indication. It is expected to run from 50 to 100 feet farther before quartz is encountered.

SUTTER CREEK MINE.—This company has started its 10-stamp mill, being closed down 20 days on account of slackness of water. The late rain has raised the water in the Amador canal. The company hopes to run its mill without any more stoppages. In upraise, 30 feet from main tunnel, have cut through some very rich strata, and notice a great improvement on the plates in the mill.

TRIPP MINE.—Dispatch, Sept. 22: This mine, near the Big Bar bridge below Jackson, looks decidedly well. A tunnel has been run in the side-hill 400 feet, where a ledge 12 feet wide has been encountered. This is 160 feet below the surface and is all pay rock. The Sutter Creek and Hector Gold Mining Cos. contemplate laying a 15-inch pipe jointly; the former company with a view of adding ten more stamps to their plant.

VOLCANO GOLD GRAVEL CO.—About 10 or 12 years ago, a company was incorporated for the purpose of mining out the flat southeast of Volcano. It was seen that something would have to be made to carry away the tailings. A tunnel was begun about a mile below the town, and after being completed, extended to the ground that was intended to be mined. The mining was then commenced and the debris was carried off by means of a flume extending through and about one-quarter of a mile beyond the lower end of the tunnel. Water was carried by means of hydraulic pipes and turned upon the loose soil, and so it is carried to-day, and perhaps will be carried when you and I have sunk behind the hill from whence none return.

CAUCASIAN.—This mine, situated near the Lady Bedford, is one of the best undeveloped properties in Amador county. The shaft is down 100 feet on the ledge, which is six feet wide. The rock in the shaft is uniform, and will go \$11.50 per ton. Mr. Vaughan, the owner, is pushing the work right along at the mine and has won for himself the name of "a practical miner."

LADY BEDFORD.—A. M. Vaughan, the owner of the above mine, sold it last Monday to J. H. Gillenwater. The price paid was \$1750. The property is situated near Enterprise and Mr. Gillenwater can congratulate himself on a good bargain.

GOVER.—Supt. Call is busily engaged laying the new pipe from Quartz Mountain. The water through this pipe will have a pressure of 423 feet at the mill, and 380 feet at the mine.

Calaveras.

NEVILLS.—Angels Echo, Sept. 22: The Nevills mine in this town never presented a better appearance than at present. It is unquestionably one of the best managed mines in the mountains. It is now 400 feet in depth, and in a few weeks sinking will be commenced and kept up to the full capacity of the machinery now in use.

ANGELS MINES.—Calaveras Chronicle, Sept. 22: The Nevills mine, superintended by D. P. Pierce, is being run constantly, with sufficient ore in sight to last two years. The main shaft has reached a depth of 400 feet with a ledge averaging 20 feet in width. At present the mine is being worked by stoping, but sinking will soon be resumed. There is a 20-stamp mill, run by water-power and crushing on an average of 50 tons of ore daily. Twenty-nine men are employed at this mine and its current expense, we are informed, is about \$2800 per month. This is one of the most substantial mines in the county. The Confidence, managed by D. H. Jones, is about 200 yards from the Nevills on two parallel veins from four to six feet in width. The ore will mill from \$20 to \$40 per ton, while the sulphurets are very rich and will yield all the way from \$300 to \$2000 per ton. From a recent assay of 1500 pounds of the sulphurets \$1480 was realized. There is a five-stamp self-feeding mill on the mine crushing on an average of seven tons of ore daily, also a Frue concentrator for saving the sulphurets. Hoisting is done by a 45-horse power steam engine, the same power also running the mill, pump and concentrator. The main shaft is at present down 100 feet and the rock is looking better as depth is attained. It is the intention of the company, we learn, as soon as another 100 feet is reached, to connect this mine with the Nevills mine by a tunnel, in order to secure better ventilation as well as an escape for the miners. Twelve men are employed at this mine. The London, situated at Albany Flat, is one of the most promising ledges in that district. This property is owned by Messrs. Jones & Reed. It has a 25-foot ledge of free-milling ore, prospecting from \$3 to \$70 per ton. A contract has been let to run a tunnel 280 feet which will tap the ledge at a depth of 180

feet from the surface. This mine is on the west belt of the mother lode. The Maggie Moore mine, at Chaparral Hill, adjoins the Hayward & Hobart mine. It has a fine 60-foot ledge which prospects at \$5 per ton. The mine is owned by John Miller and has been bonded to J. H. Reed for one year. The Stevenot property, comprising a large tract of mining land at Carson Hill, has been sold to an English company who intend erecting a 100-stamp mill on the same.

Nevada.

GRANITEVILLE.—Tidings, Sept. 18: This sleepy village of less than two years ago is now a representative mining camp, with all that name implies, save that reckless lawlessness does not exist. New dwellings and boarding-houses are going up, new store buildings being erected, and all is life. Developments in quartz have brought about this evident prosperity, and in particular the developments in the Rocky Glen mine, owned by Alvina Hayward and partner. This property promises to become one of the greatest mines in the history of the county. Other claims are showing up and dozens of prospectors are in pursuit of buried bonanzas. One of these delvers struck it rich last week, according to Jas. R. Smith of this city, who was in Graniteville on business at the time. The man came into town with his mule laden with quartz, which showed gold freely. The find was made in the vicinity.

AN IMPORTANT ENTERPRISE.—Herald, Sept. 18: On the other side of Sugar Loaf, Jerry Blake is prosecuting an enterprise upon the success or failure of which this place has a great interest. His company is running to tap the Manzanita channel. Work was commenced this spring and has been steadily proceeded with up to date. They sunk a shaft 170 feet deep and then commenced to drift. The drift is about 150 feet in blasting rock. The drift will be continued until the channel is reached, or until it is believed it is under the center of the channel, which if not encountered then, an upraise will be made to tap it. If successful, the development will give scope for large operations by that company and stimulate other owners along the line of the lead to also commence operations. The present showing in the Manzanita mine warrants Mr. Blake's company in expecting to strike a rich and extensive mine.

THE DELHI.—Nevada Herald, Sept. 22: The Delhi is an even-tempered and perpetually smiling young Miss. She has no frowns for her admirers, but is always coquetting with them. On Sunday and Monday of this week the amalgam taken from the plates alone was worth \$1000, with an even chance that the amount contained in the batteries equalled or excelled it. The lower tunnel has reached the ledge and pay-shoot, and the rock comes up to the expectations of the owners. The sulphurets works will soon have caught up with the supply on hand and will consequently shut down for a time.

LIKELY TO START UP.—Herald, Sept. 18: We hear that parties have leased the Nevada City mine and will commence operations there soon. If the report proves true it will be good news for this section. It is well known that the mine is a good one. The starting of one mine will stimulate other owners to renew operations. It would not take three months to revolutionize times around this city if the really good mines heretofore were put in operation. The mines are here, but owners have been waiting.

NEW MILL FOR THE PITTSBURG.—Grass Valley Union, Sept. 20: The Pittsburgh Mining Co. is having plans and specifications drawn for a new 10-stamp mill, which will have all the best and latest improvements for saving gold and sulphurets. It is the intention to build this mill with the least possible delay. The favorable developments in the Pittsburgh justify the erection of a new mill to take the place of the present mill, which is old and not up to the requirements of the present modes of milling.

TWO MINES BONDED.—Herald, Sept. 22: J. Ream of Sacramento, as representative of a company of Chicago, Ill., and London, Eng., capitalists, has bonded for a term of four months the Merrifield and Charonnat quartz mines in this city. It is expected that some of the members of the company, with their experts, will arrive here within a few weeks to make a careful examination of the properties, both of which have been heavy producers in the past.

MACHINERY FOR THE ERIE.—Nevada Transcript, Sept. 19: To-day 22,000 pounds of milling machinery will arrive for the Erie quartz mine near Graniteville. This property at one time produced considerable gold, but some years ago it got a set-back from which it is now recovering. A company represented by E. W. Roberts of the Baltic mine has taken hold of it and will push its development as fast as possible.

GOOD ORE AT THE CALIFORNIA.—Transcript, Sept. 23: It is said that in the lower tunnel of the California mine, on Gaston Ridge between Graniteville and Washington, the ledge is 17 feet thick and averages \$25 a ton. The California has for quite awhile past been paying well, and is now in a way to yield larger returns than ever.

THE NEW MILL FOR THE ERIE.—The milling machinery that arrived here last week for the Erie mine near Graniteville will be built and in operation before snow flies. The San Francisco company which has the property bonded from Frank Morse will lose no time in opening it up.

Shasta.

FROM IGO.—Cor. Shasta Courier, Sept. 22: A party of experts was up the past week examining P. Gibney's mines and others adjacent. Mr. Shaffer is taking out ore at the Live Oak, to run through the Eubanks arastra, where water is plenty for power. L. U. Duhig is finding some good ore in a ledge near his place. J. P. Wright is working two shifts on his lower tunnel, and shipping sulphurets. Shirland Bros. have bought D. H. Hubbard's mining interests. They are running their arastra on Pacific ore, and running a lower tunnel; also taking ore out at the Lone Star. E. L. Ballou's arastra is running on Hope ore. A tunnel run to connect with the old workings shows considerable good ore ready to stoep. He is also running a concentrator on tailings.

QUARTZ.—Shasta Courier, Sept. 22: Rich discoveries of gold-bearing quartz have been made on Soda creek, near Lower Soda springs, and several locations have been made by different parties along the creek.

CALUMET.—Shasta Democrat, Sept. 20: The Calumet M. Co.'s mill, which has been lying idle for

some months, pending the placing in of their water-power and other machinery, will be ready to start up about the 1st of October. This company has placed in their works a 200-horse power Knight water-wheel.

THE AMERICANIZED ARASTRA.—The Calumet Co. has put several more of these arastras in their mill. Nothing beats these arastras for saving gold.

Sierra.

MOUNTAIN MINE.—Sierra Tribune, Sept. 22: Mr. Robt. Barton was here this week as the guest of Mr. O. Sunderhaus, examining mines hereabout. From this place he took his departure for London. Mr. Barton visited the Young America and Mountain mines, and to the Tribune representative expressed the opinion that these were among the best mining properties in the State. Apropos to the subject, we may say that operations are going steadily on at the Mountain mine. About 150 feet in No. 1 tunnel, a raise has been put up 60 feet and a fine body of ore encountered. No. 3 tunnel is being run ahead. No. 4 adit will be started shortly, which will give 700 feet stoping ground below the present workings, and 130 feet entire depth on the vein. It is expected to have this tunnel in to the ledge and all connections made above by the time the mill is built, which it is pretty well decided upon will be next July.

Siskiyou.

PROSPECT WELL.—Yreka Journal, Sept. 19: We learn that George Simmons and others have found a very rich ledge on Humbug creek, above Thornton's late discovery, which prospects exceedingly well. Thomas Orr has just had a lot of quartz crushed at Forks of Humbug mill, from the dump of the Siskiyou ledge, which he now owns. It is reported this quartz will realize a rich cleanup. The Hegler Bros. and Bruce Aldrick are still running their mill on Humbug, with excellent success, having an abundance of good paying rock on hand. Their mill has been running steadily all summer, crushing only about 20 tons for other parties.

Tuolumne.

POCKET MINE.—Union Democrat, Sept. 22: It is reported that the Phillip brothers at Chili camp are doing well in their pocket mines. Messrs. Chris. Drescher and Elias Dunaway are still getting big results at their mine on Blue gulch. J. B. Curtin of Cloudman's was in Sonora this week. He is about putting on a ten-animal team to run from Oakdale to the Eureka Consolidated and Summerville. The big ditch on the Stanislaus river that is to carry water to the 100-stamp mill at Robinson's Ferry will extend above Parot's ferry, and be about six miles in length. Mr. J. P. Kerrigan of the Platt and Gilson mine informs us that two new engines are now being placed in the mill, and all the machinery equipments strengthened for continuous and effective work this winter.

CARLOTTA.—We learn from good authority that the total returns of the crushing of the ore from the Carlotta mine (formerly erroneously mentioned as the Laura) have been received. Ninety-one tons in all were crushed and yielded \$4700. This is considerably over \$50 per ton. There is about five per cent sulphur to the ton, which is comparatively a higher percentage. We understand that the sulphur assays very high. Mr. Symons is now getting out a heavier crushing of ore, and the lode continues its fine record.

DORSEY.—Messrs. Bauli, Williams & Co. are doing good work in the Dorsey claim. The shaft is now down nearly 100 feet. Everything is looking well, the lode being strong and carrying a live quartz which has every indication of being in close proximity to gold. The parties expect to reach slate shortly, when no doubt a pocket will be developed.

Yuba.

THE JUNCTION MINE.—Nevada Co. Herald, Sept. 22: The above mine is at the junction of the North and Middle Yuba rivers, two and a half miles from San Juan. The formation is about 35 feet wide, mostly of slate with stringers of quartz running through the formation. On the hanging-wall there is heavily sulphureted galena ore. The sulphurets in the balance of the lead are copper pyrites. It is said the sulphurets assay from \$300 to \$600. The rock yields from 10 to 15 per cent of these sulphurets. The developments so far consist of a shaft 50 feet deep. From the bottom a crosscut has been run into the formation 16 feet. The owners have also started a drift south on the hanging-wall. It is intended to put up a crushing-mill and concentrating machines before winter sets in. Considering the size of the ledge, the abundance of free-water power and the general surroundings, the ledge bids fair to be valuable.

NEVADA.

Washoe District.

BEST & BELCHER.—Virginia Enterprise, Sept. 22: West crosscut No. 1 from the main northwest drift has been extended 43 feet; total length, 188 feet. The formation is quartz, giving low assays. Near west crosscut No. 1 have advanced a west drift 20 feet and a west drift 8 feet.

CON. CAL. & VIRGINIA.—On the 1435 level the east crosscut started from south lateral drift No. 2 at a point 70 feet south of west crosscut No. 1, has been extended 15 feet; total, 61 feet. The face is still in vein material giving low assays. The stopes east of the winze below this level are yielding the usual quantity and quality of ore. On the 1500 level the southeast drift 58 feet above this level, which extends from the upraise, is still yielding a large amount of good ore. On the 1600 level much good milling ore is being extracted from the drift south from the Ophir line at a point 36 feet above the track floor. On the 1650 level, the upraise from the drift running south from the east drift from the Con. Virginia shaft has been carried up 20 feet; total, 86. Are continuing to stoep out ore at the end of the south drift. During the week the usual amount of ore is being shipped to the Morgan and California mills. The pulp assays will average about the same as last week.

GOULD & CURRY.—On the El Dorado tunnel level the east crosscut from the main south drift has been extended 11 feet; total length, 67 feet. The face is in porphyry and work has for the present been discontinued. The north drift started from west crosscut No. 2 has been extended 7 feet; total length, 52 feet. This drift has connected with the main incline from the drain tunnel. East crosscut

from the top of upraise No. 1 has been extended 22 feet; total length, 30 feet. The formation is quartz and porphyry. On the drain tunnel level the south drift started from east crosscut No. 2 has reached the south line, and from this point an east crosscut has been advanced 36 feet, passing through low-grade ore.

HALE & NORCROSS.—Good headway is making in the exploring drifts on the 500 level. On the 600 level the south upraise has connected with the south drift on the 500 level. The north upraise from the 600 level is up 26 feet, and the west drift from the 800 station is out 102 feet. It is in ground of a very favorable appearance. The company has on hand \$31,700, with all debts paid.

CONFIDENCE.—The mine is being thoroughly overhauled and repaired. Good progress is making in this work, and the several levels and the mine will be in fine condition for economical and rapid work when the extraction of ore is resumed.

SAVAGE.—The southeast drift on the 400 level has been extended 36 feet, and the south drift on the 500 level 44 feet. The whole width of the last-named drift is in paying ore. A good deal of repair work is being done on various levels, and repairs are also being made in the main shaft.

CROWN POINT.—On the 700 level No. 1 crosscut is now out 75 feet. It shows a considerable amount of milling ore, also a small flow of water. The work in prospecting sections promises well. The drift to connect with the Suro tunnel is out 785 feet.

UNION CON.—The joint Union and Mexican north drift, started from the east drift from the Ophir shaft on the 1465 level, has been extended 40 feet; total, 288.

WEST CON. VA. & CAL.—The main shaft is about 260 feet deep. Some very rich bunches and stringers of ore have been encountered during the sinking.

UTAH.—The east crosscut on the 472 level has been extended 40 feet; total length, 188 feet. The formation is porphyry and clay, showing some water.

MEXICAN.—The joint Mexican and Union shaft drift, started from the east drift from the Ophir shaft on the 1465 level, has been extended 70 feet; total, 258.

SEG. BELCHER.—Good headway is making in the south raise. It is now up about 100 feet. The material encountered is of a promising appearance.

SIERRA NEVADA.—East crosscut No. 2 from the main south drift on the 520 level is still in a porphyry formation, which is showing some quartz.

OPHIR.—Good progress is making in reopening and retimbering the old east drift on the 1465 level. A good deal of exploring work is being done.

BELCHER.—At the 200 level a station is being excavated preparatory to starting a north drift. At the old shaft the incline is being repaired.

ALTA.—The mill and concentrators are doing good work. The ore-producing sections of the 825 and 1150 levels are looking well.

YELLOW JACKET.—Good progress is being made in the surface repairs. The foundations of the machinery are being overhauled.

OCCIDENTAL.—Extracted 128 tons of ore and shipped to the mill 114 tons. Value of wagon assays, \$22.

JUSTICE.—Good headway is making in the erection of the new mill. The mine continues to look well.

SCORPION.—There is no change in the material encountered in the south drift on the 500 level.

LADY WASHINGTON.—The upraise from the 725 level is making good progress.

KENTUCK.—Good headway is being made in the work of sinking the shaft.

BALTIMORE.—The work doing in this mine is confined to the 382 level.

ANDES.—Are engaged in the work of retimbering the main shaft.

BULLION.—Usual work going on in the prospecting drift.

OVERMAN.—Exploring work still in progress.

Eureka District.

SHIPPING TO SALT LAKE.—Eureka Sentinel, Sept. 23: We understand that upward of 2000 tons of ore will be shipped to Salt Lake from the Hamburg, Jackson, Dunderberg, Diamond and other mines of the district, owing to the combination between our local smelting companies and the high rates charged by them for reduction. It is claimed by the shippers that they can realize from \$3 to \$12 per ton more on their ore over and above the expenses of shipping and treatment than would be paid in Eureka. A large number of ore sacks have been ordered from San Francisco and the shipping will follow upon their arrival.

ORE SHIPMENTS.—During the past week ore shipments were made from the following named mines of the district to the furnaces: Hoosac, 42½ tons; Eureka, 1¼; White Pine, 3; Storm, 2¼; Silver Lick, 13; El Dorado, 6; Rocky Point, ¾; Geddes & Bertrand, 7½, and the Evans, ¾. From the Silver Connor mine, 186 tons; Silver Lick, 31; Rosecranz, 2; Brown, 16; Banner, 10; Woodchopper, 11; May Lode, 4; Reindeer, 2; and the Little Rose, 11.

New Pass District.

MINING REVIVAL.—Silver State, Sept. 18: There is a mining revival in New Pass district. The district is situated on the line of Lander and Churchill counties south of the Humboldt boundary and about 23 miles west of Austin. The mines were discovered many years ago, the principal leads being the Superior and Gold Belt. They are gold-bearing veins and are developed to a considerable extent by tunnels and shafts. A five-stamp mill was erected to work the ores, which gave about \$25 per ton in gold. This did not pay in those days and the mines were abandoned during the White Pine excitement in 1868 and the mill taken away. The mines were patented by an Eastern company, of which Capt. C. B. Dahlgren is agent. The ledges are from one to four feet wide and tests of the ores recently made have been satisfactory, and work will be resumed on the leads immediately. The company purpose using Huntington pans in working the ores.

Wild Rose District.

THE PARADISE MINES.—Silver State, Sept. 18: T. J. Bradshaw of Paradise brings very encouraging

news from the mines. He says they have cut a five-foot ledge in the Paradise Valley, 18 inches of which averages \$100 in silver to the ton. How extensive this ore body may be is not yet known, as the ledge was cut last week. Three shifts of men are at work upon it, and the rich ore streak is steadily widening. In the Wild Goose, which is owned by the Paradise Valley, a shaft has been sunk 100 feet in the tunnel, at the bottom of which there is a large body of good ore. A hoisting engine has been ordered for use in this shaft, and a boiler is now being put in place. The Cliff mine is also looking well and producing very rich ore. Mr. Bradshaw says the mining outlook is better than it has been for a year.

Tuscarora District.

DEL MONTE.—*Times-Review*, Sept. 22: The combination shaft has been sunk and timbered to feet. Rock continues hard.

COMMONWEALTH.—100-foot level: Joint crosscut from south drift, to connect with upraise from 150-foot level, has been extended 35 feet, passing through some very rich ore with seams of ore still in the face. The joint upraise to intersect joint crosscut has been extended 9 feet, the top showing fine ore. The north intermediate is being opened up and is developing very rich ore. 150-foot level: No. 3 north drift from east crosscut has been advanced 12 feet following the vein, giving low assays, looking very favorable for ore when crosscuts are run. No. 1 north drift from No. 1 west crosscut has been advanced 20 feet. No. 2 winze from east lateral drift is down 10 feet and showing very fine all across the bottom. Joint crosscut to connect main south drift with east lateral has been extended 19 feet, face being vein matter. The 225-foot level has been extended 18 feet, the face showing the same as east lateral 150-foot level. Assays show \$230 per ton. The dump at bottom of shaft has been finished. Work at the new mill is progressing very favorably; large amount of contractors' freight arriving.

NEVADA QUEEN.—The joint crosscut from south drift, 100-foot level of Commonwealth, has been advanced 35 feet, cutting some high-grade ore, which will be opened up as connection is made with the upraise from 150-foot level, which has been extended up nine feet, showing good ore. Joint crosscut 150-foot level has been advanced 19 feet, face being in vein matter, showing some mineral. Good progress has been made in the joint upraise from 450-foot level and will reach the 350-foot level within a few days. The stopes are looking well and yielding a full supply for the mill. Assays for the week average \$102 per ton. Shipped Monday, bullion, estimated value, \$20,300. The mill is running nicely and doing good work. Average assay of 350 carloads of concentrating ore hoisted during the week show \$22.95 per ton.

NORTH BELLE ISLE.—East crosscut No. 2 north, 300-foot level, extended five feet; rock looks favorable but is very hard. Good progress has been made in the joint upraise from the 400-foot level. The stopes have yielded the usual amount of ore. The concentrator is awaiting the arrival of the water company's pipe line. Good headway is being made with the grade for the Union mill. The stonemasons and millwrights have arrived and the work of construction will soon be under way.

NAVAJO.—Crosscut from south drift, west vein, 350-foot level, extended 10 feet. Crosscut from south drift, west vein, 150-foot level, extended 10 feet. The stopes on the 350-foot level continue to look well and are yielding high-grade ore.

FOUND TREASURE.—Northeast crosscut from near the face of southeast drift, on southwest vein, 150-foot level, has been extended and timbered 15 feet. Southeast drift 200-foot level, has been extended and timbered 30 feet.

NORTH COMMONWEALTH.—The combination shaft has been sunk and timbered to ore. The rock continues hard, but looks favorable for ore.

GRAND PRIZE.—No work being done in the mine. Water being hoisted at the rate of 400,000 gallons per day.

BELLE ISLE.—Crosscut from north drift, 250-foot level, extended 10 feet. Rock quite hard, but breaks well.

ARIZONA.

NOTES.—*Prescott Courier*, Sept. 19: There are 20 miners working at and near the Dosoris mine. Mr. Pace, of Hassayampa district, tells us that there are about 200 miners at work there. If our miners could get their low-grade ores worked at a small profit, they would be happy and the country would be very prosperous. Sam F. Powell and others exhibit excellent ore from the new district below Walnut Grove. Rudd & Helly, of Florence, Nebraska, will soon be here to try their dry concentrators. Ore from the Howard mine, ten miles south of Prescott, is yielding \$1000 a ton, in gold. So we are informed by its owners, Messrs. Harlan & Barrington. They were here Saturday last and banked nearly \$5000 in gold, which they had crushed out of their rock in a 2-stamp mill in less than a month. They have connected their tunnel with the shaft, have 200 tons of ore in sight that will mill \$1000 a ton. They will add a concentrator to their other machinery. The Senator mine in same section is full of promise. Carmichael Bros., of Joe Walker district, have struck it rich in a new ledge, which is near the Farnham mill. Not much work has, as yet, been done in this ledge; top rock assays \$678.24 in gold and 250 ounces silver to the ton. Frank Foster, of Robeson & Foster, owners of the Middleton mine, Big Bug district, arrived yesterday. He is shipping a carload of high-grade ore through the Arizona Ore Company; has several tons at Van Name's mill. Three wagon-loads of high-grade sulphuret ore have recently arrived from the Congress mine. The ore works have all the ore they can handle, and as a miner who came here recently from the great Homestake mine said: "No other country save Arizona could furnish so much high-grade ore as has been shipped from here since the advent of the railroad and the sampler."

MOHAVE NOTES.—*Miner*, Sept. 22: A good many mining locations are being made to the San Francisco district. Miller & Hitchcock have a lease on the Short Starter, H. P. Ewing's new discovery in Peacock mountain. There are several sales of mining properties on the tapis, and we hope to record their conclusion before many weeks. Chas. Gross has about a ton of copper concentrates at the Sampling Works, and intends bringing in a carload. The concentrates go well up in gold and sil-

ver. The Elkhart mine near Chloride, a lead property, is being worked by Colorado parties. The ore is being shipped to the Pueblo smelters, presumably for flanking purposes. The Cupel mine is still in wonderfully rich ruby silver and will soon make a shipment of several carloads. The Cupel is likely to prove a big bonanza to the present lessee, John K. Mackenzie. With silver at \$1 and lead at \$5, Mohave county would soon stand at the head of Arizona counties as a producer of these ores, and all the camps in the county would take on a new lease of life. J. C. Potts has a lease on the old Cupel at Stockton hill, and has done about three weeks' work on it. He reports that a small streak of ore has been struck with every prospect of its widening out. The San Francisco mining district is coming to the front. Dan O'Leary has made a rich strike on the Old Hardy mine on Silver creek. The streak is a foot wide, and assays made give a return of \$90 in gold and \$120 in silver.

BRITISH COLUMBIA.

MACMURDO DISTRICT.—*Donald Truth*, Sept. 15: John Hepburn has men at work on the Chief of the Selkirk and is well pleased with the outlook, that claim and the Bobby Burns showing up fine. The Calgary Co. already has a tunnel in over 40 feet on the Monitor, and are satisfied with the showing.

PORCUPINE CREEK.—Things are moving along slowly but surely on Porcupine. The Discovery Co. has taken out between \$500 and \$700 for their five weeks' work, which includes the time engaged in building cabin, whipsawing lumber, making sluice-boxes, turning creek, and doing other preparatory work. They are now sluicing from the middle of the creek-bed with good results. The Sprague Co. struck bedrock at a depth of five feet, and had a very satisfactory cleanup. The Horseshoe, Donald Placer, Michigan and French Companies, after making surface cleanups, are sinking shafts, hoping to strike bedrock within 25 feet. Twenty men are at work.

WORK PROGRESSING.—Mr. Davis, who is in charge of the Monarch Co.'s properties near Field, was in Donald one day this week, accompanied by Mr. DeVolf, the gentleman who first bonded the properties from the Coffmans. They said that development work was in a forward state, and that as soon as the tramways were completed ore shipments would begin. All the machinery for the company's smelter at Vancouver is on the ground.

A RICH STRIKE.—W. J. Irving came up to Donald on Monday from the Big Butte district, where he has several promising locations. He brought in some rich specimens, which look as if they would go way up in the thousands—much resembling Toad-mountain ore. Big Butte is four miles from the Columbia river by Jubilee landing.

COAL.—J. M. Kellie and Harry Estelle have made a discovery that, if banded right, will make them the Dunsmuirs of this section. Some six miles southwest of Golden they have located a coal mine. The seam is 21 feet in width.

NEARING THE OLD CHANNEL.—Advices from Fort Steele are that the Perry Creek G. M. Co.'s drift is nearing the old channel, as several small nuggets have been found in the face of the drift.

COLORADO.

FROM DIFFERENT CAMPS.—*Silverton Miner*, Sept. 18: Capt. Walker has started a new tunnel in his Ophir mine, which will cut the Caribou streak at least 125 feet deep. A 100-ounce gold brick from the Suffolk was brought to Silverton by way of Telluride this morning. J. F. Steinback is working a force on the Bon Homme, near Animas Forks. The property is one of the most promising in that district. The new ore body in the 7th level of the North Star on Solomon has widened out to seven feet of solid gray copper. This is the biggest thing in the San Juan. Capt. Kendall and Rich. Lambert have this week shipped 15 tons of gold quartz from the Mabel to Perry Fisher's mill at Gladstone for a trial run. The result of the cleanup after a run of 25½ tons of Suffolk ore was 100 ounces of gold. The Suffolk mine at Ophir is showing up better than ever. During the coming week 40 tons of ore will be treated, and even better results are expected. The Gold Prince is the wonder of Cement creek. The lessees, Messrs. Eliot and Haynes, have been extracting ore steadily since they began work, and in sinking a shaft five feet have taken out a ton of high-grade mineral. The Nevada mine at Ophir, under the lease and management of Bell & Hunter, is again to the front as a shipper of first-class ore. A streak of gray copper averaging six inches wide and running 200 ounces of silver, is almost continuous through 150 feet of stopping ground. Two carloads were jacked over to Burro Bridge this week. The Whale five-stamp mill is exceeding the expectations of its owners. Thousands of tons of ore, which without milling facilities were worthless, can now be treated at an enormous profit. Mr. Horace Brock, one of the owners of the Mountain Queen, made an inspection of the mine this week and was very much pleased with the outlook. The mineral is getting wider every foot advanced on the drift, and from a specimen brought down to this office, it looks very rich. A large number of improvements will be made immediately, including a new house, electric-light plant, etc.

DAKOTA.

SILVER BULLION.—*Deadwood Pioneer*, Sept. 17: We learned yesterday that the miners at the Silver Bullion were laid off for an indefinite time. This action upon the part of the management was deemed necessary for the reason that the mine is now fully developed. The ore bodies are exposed at numerous places and assays from the different parts of the vein have established the value. The vein, which is lateral, is tapped at one place by an 80-foot tunnel, at which point it is 40 feet thick. It is likely that negotiations for a plant will soon be consummated with Eastern parties.

FLOAT.—The Buxton is one of the best paying properties in Ruby. Last summer it shipped ore enough to Omaha to pay all expenses and a dividend of 50 cents per share besides. The Buxton is making regular shipments of ore to Omaha this season. The Spanish R. and Adelphi have been making regular shipments of ore to Omaha this season. The mines are looking well and there is considerable ore in

sight. A rich strike in the Equitable was reported in town yesterday. This is a new company that was organized a few weeks ago in the Ruby basin district. The property is well located, being in the immediate vicinity of the Retriever. Supt. John McVean of the company has had a force of men developing the ground during the past two weeks, and yesterday rich ore was struck, averaging \$20 to \$25 per ton.

IDAHO.

CEUR D'ALENE.—*Wardner News*, Sept. 17: The Palmer Fraction, located south of the Sierra Nevada mine, is owned by Kennedy Hanley, W. A. Kenney, Frank R. Moore and Charles Sweeney. They commenced work on the property last February and have since that time expended \$13,000 in its development. Recently their labor and expenditure have been rewarded by their finding the vein at a depth of 125 feet from the surface; it is six feet in width and appears identical in character with a similar display in the Sierra Nevada mine. The owners intend immediately putting in hoisting and pumping machinery.

HUNTER MINE.—From all appearances a lively time will soon be inaugurated at the Hunter mine. Mr. Ryan informed a *News* reporter that the machinery is all ordered from Fraser & Chalmers' foundry at Chicago and will be shipped to Mullan at an early day. X. S. Burke is at present engaged in making a survey of a location for the millsite and also for the water ditch and tramway that is to be constructed from the mine to the mill. The capacity of the concentrator will be 150 tons per day, but a mammoth building will be erected capable of accommodating additional machinery and increasing the above figures as required.

EVOLUTION DISTRICT.—Work was resumed on the Argentine mine on the 5th inst. An increased force of men will be employed in a few days, as it is the intention of the owners to push work vigorously this fall and winter. Hoisting works have been ordered. The Bismarck, one of the most promising locations on Big creek, is owned by G. W. Sparenberg and H. Gerhardt. They have a tunnel in 100 feet which they are now extending on a good showing of galena ore.

BEAVER DISTRICT.—Five more promising locations called the Monitor, Amazon, Manhattan Fraction, Grouse and Grouse Fraction, form what is known as the Grouse group on Carbon creek. Work is progressing on the Grouse and Manhattan Fractions, and the owners, J. H. Smith and F. M. Franks, are highly elated with the development made.

HUNTER DISTRICT.—Most encouraging news is daily received from all parties interested in mining on Hunter gulch. The Morning lode on Chloride hill is looking better than ever; the ore is holding out in quality fully equal to the expectations of the owners and is increasing in quantity every day.

MILGULCH.—"Doc" Hamblin will recommence work on the Milo Blue Blanket lode joining the Kellogg townsite. This claim is on the Elk creek belt and presents most favorable indications. The Stemwinder Mining Co. commenced this week shipping concentrates to Wickes, Montana.

MONTANA.

FLAT CREEK.—*Cor. Wardner News*, Sept. 18: I have just seen the result of four assays of ore taken from the new discovery of Hall, Jones and Frazer, on Flat creek, Montana, which is as follows: No. 1, \$93, 25 per cent lead; No. 2, \$57, 36 per cent lead; No. 3, \$120, 58 per cent lead; No. 4, \$268, 39 per cent lead. These assays were made by C. W. Wing of this place, and are an average taken from four feet of the vein as a test of its real value. The owners say they have a vein of iron 100 feet wide, from 18 to 20 feet of which shows nearly the same character of ore as that which they have had assayed. Flat creek is one and one-half miles east of Kennedy & Joyce's claim—the Grant—on Deep creek, and four miles from O'Rourke, on Spring gulch, and the Iron King and Queen mines. This new discovery, the Iron Tower, as it is called, is the most important of the many that have been made in the Spring gulch country this season. The boys say there was quite an excitement over their discovery when they came here to get their assays made, but that there will be a greater one when they return, as no one believed the ore would assay half as well as it does.

THE HELENA SMELTER.—The work of construction at this institution moves steadily onward, some 200 men working night and day. One stack is now about 100 feet high, and another is up to a height of 80 feet. An army of carpenters, masons and bricklayers are busy around the place working at the dust chambers on the main building, laying foundations and brick. It is expected that the first section of three stacks will be ready for business in about three months. All the main side tracks are now about completed, so that the handling of material used in construction is now much facilitated. The Smelter Co. will soon commence the purchase of ores.

REDUCTION WORKS.—*Stevensville Tribune*, Sept. 20: In July we stated that A. M. Holter's visit to the Curlew mine, in which he is largely interested, had its significance. Sure enough, a location for a concentrator, with a capacity of less than 50 tons per day, is being surveyed this week by I. O. Kennedy and party. The location is just below the shaft on the east end of the claim—a most convenient one, as water and wood are inexhaustible. Since July 20th nine carloads of high-grade ore have been taken from the mine and shipped to Wickes for reduction. Five cars will leave Victor this week and are now being loaded. Three thousand tons of low-grade ore, which will be worked by the new concentrator at a handsome profit, is now on the dump.

NEW MEXICO.

THE SITUATION.—*Kingston Shaft*, Sept. 18: The mining situation improves. Two mines have shut down on account of the large amount of ore in sight in order to give time to get more economical methods of taking out ore. The gouging and "gophering" process has been too common here, and mine-owners are beginning to realize that we have mines here, and that the costly ways they have been practicing in getting their ore to market is

costing them fortunes every month. The fact that no ore netting less than 30 ounces does not pay to take out, shows that something is wrong with our methods.

KEYSTONE DEVELOPMENTS.—The most important strike in camp after the Lady Franklin, if it is not indeed the most important which tend to solve the problem of whether ore is "deep down" in our camp, is the recent strike in the Keystone on the North Pehra. This mine is one of the oldest locations and has always contained ore, but no effective development work has ever been done on it until the present company took hold of it. The mines that have been opened on the same vein, viz., the Virginian and Templar, have shown up large as well as rich ore bodies. The highest workings in camp are the Iconoclast as far as levels have been taken, a little over 9000 feet high. The Templar shaft is 500 feet lower; the Templar tunnel is 635 feet lower; the Equator tunnel, in which the rich ore has been struck on the Templar vein, is 795 feet lower; the collar of the Keystone shaft is 965 feet lower than the Iconoclast shaft. These heights are really the ascent or fall of the mountain in a distance of about a mile, and along the vein. The deepest workings on the Keystone shaft are about 150 from the surface, which is about 115 feet deep counting from the mouth of the Iconoclast shaft. In depth the Keystone has the advantage, except in dumping facilities. The deep-ore find in the Lady Franklin is in a drift from the deep shaft 370 feet deep. The collar of this shaft is lower than any on the Bonanza hill proper. The late deep-down strike on the Keystone is 150 feet deep and 125 to the north in a drift, just under the bed of the creek. Ore all over the face of the drift. The main ore streak is from 15 inches to 2 feet wide. On the face of the drift, assays run from 50 to 500 ounces from average samples, no choice of picked assays.

UTAH.

REVIEW.—*Salt Lake Tribune*, Sept. 21: The week closes with good feeling in mining circles, lead high, silver rising, and the smelters in full blast. It is a pleasant contrast with the dullness and gloom of the past summer. The receipts of metals in this city for the week ending September 19th, inclusive, were to the value of \$149,394.12, of which \$82,004.96 was ore and \$67,389.16 was bullion. For the week previous the receipts of ore were valued at \$69,435.60, and of bullion at \$82,444.04, a total of \$151,879.64. The Ontario product for the week was \$43,355.76 from ore sales; no bullion. The Daly output for the week was 10 bars of fine bullion, 11,999.63 ounces. The Horn Silver is silent, though with the enhanced price of its products it ought to be making a showing. Fine bar receipts in the city for the week were to the value of \$11,951.83; base bullion, \$8600; copper matte, \$273.74. The Hanauer smelter produced during the week bullion valued at \$16,450; the Germania, \$28,564.42. Ore receipts here for the week were \$43,795.83 in value by Wells, Go & Co.; \$25,150 by McCorkick & Co., including \$1150 Queen of the Hills and \$4700 Crescent; and \$73,058.13 by T. R. Jones & Co.

PARK NOTES.—*Record*, Sept. 22: The third week's developments on the new strike by the leasers of the Woodside property are highly satisfactory to say the least. An incline on the vein at the discovery is down some 20 feet now, and the new ground between the walls is looking fully as well as could be expected. The formation looks as though it would be regular and permanent, and Messrs. Farish, Drake and Willmans have reason to believe that it will prove to be a contact vein, between lime and quartzite. Last week the formation at the new workings seemed to be considerably broken up, but as more depth under the surface was reached this unfavorable sign disappeared almost entirely. There are about 100 tons of ore now in sight, and some 50 tons, chlorides and carbonates, the average assay value of which is nearly \$100 a ton, are on the dump for shipment. The Woodside leasers' strike is proving to be a veritable bonanza, and little fear is now had about its permanency.

THE APEX'S OPERATIONS.—Mr. Fenton said that there was comparatively little of the Apex's ground along the vein opened up yet. Their connection with the Crescent gives a free circulation of air, but the great length of their tunnels, drifts and crosscuts has but little more than opened up the ore body so it can be worked advantageously without a compressor and other machinery. Fourteen men are now employed, and another shipment of about 50 tons is being made up. The Apex is in its youth, and it is believed that its best days of ore-producing are yet to come.

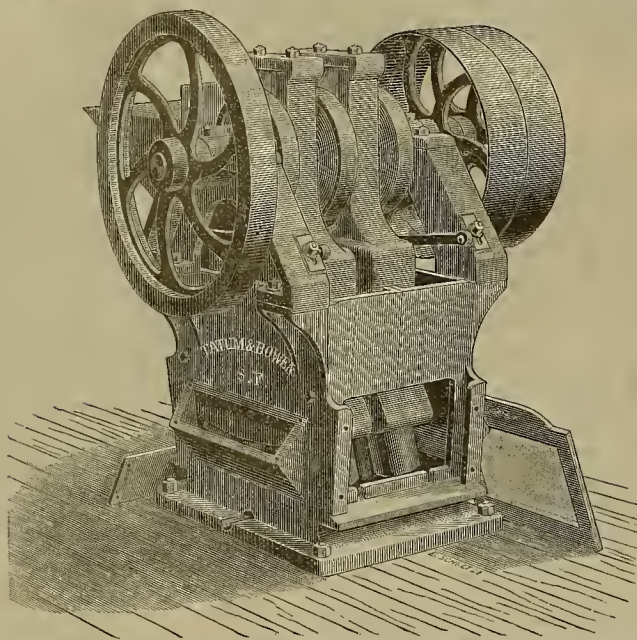
THE CRESCENT DRIVING AHEAD.—Sinking in the big incline shaft from the 230-foot point has not yet been resumed, because the flow of water is too great for the pump to handle effectively. As soon as a new and larger pump which has been ordered arrives and is put in place, sinking will be commenced again. The other parts of the mine yield the old average of ore and about 150 tons of first and second-class come down the tramway daily.

ON BONANZA FLAT.—Three new surveys in the last two days in Snake Creek mining district, and the locating of all the known fractions believed to be on the line of strike of the Daly, Ontario and Ancor, will settle conflicting titles so far as patents can do so. Much work will yet have to be done to open up the property along Bonanza flat and vicinity, but that it is the center of the mineral belt between Park City and the heads of the Cottonwoods, is as near a settled fact as anything can be.

WASHINGTON.

BIG GOLD DISCOVERY.—*Ellensburg Capital*, Sept. 20: Mr. Meagher, who has been engaged in mining on the Swauk, cleaned up \$1400 in nuggets and fine gold. Among the nuggets was one weighing 564. He informed the *Capital* that he had traced the float and had discovered a fine ledge, in connection with Mr. Black, which was regarded by them as the long-sought mother lode. They first discovered decomposed quartz which showed from 200 to 400 colors to the pan, and after going through this they struck what they regard as the ledge. This ledge is free-milling and will assay about \$80 to the ton. The gold discovery is within 25 miles of Ellensburg and almost within sight of the railroad. It is regarded as one of the most important discoveries ever made in Kittitas county.

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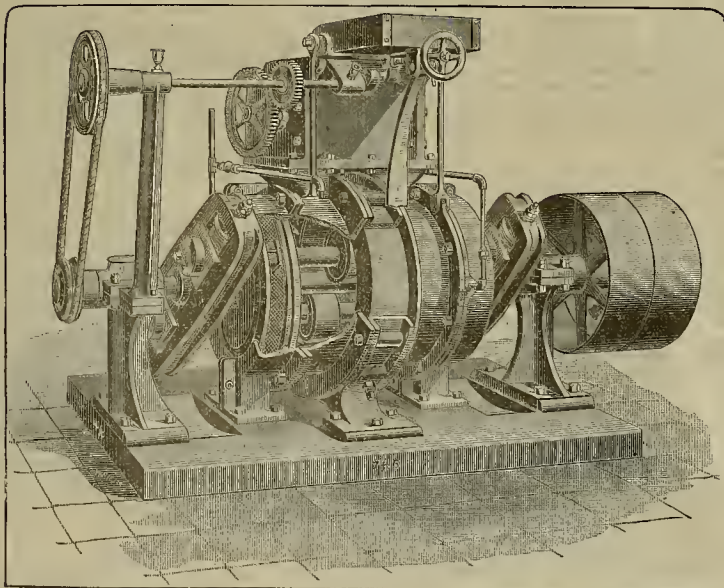
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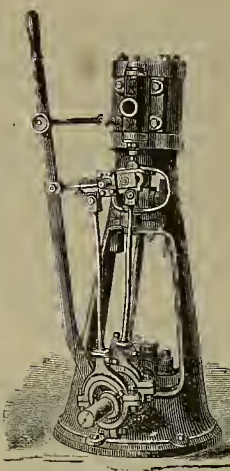
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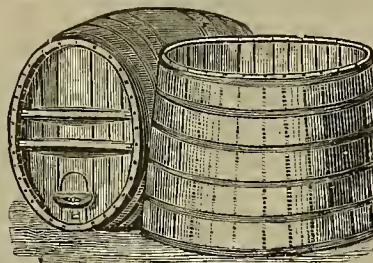
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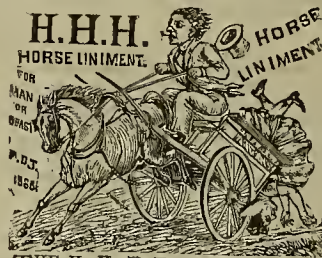
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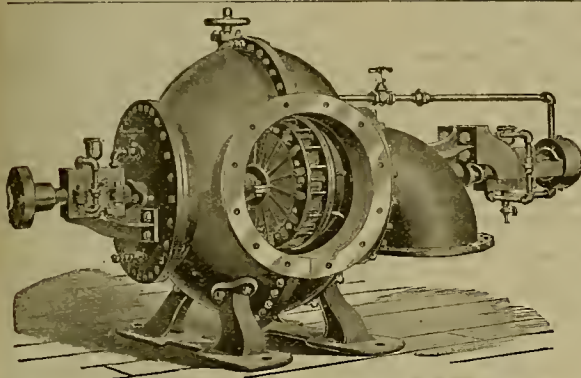
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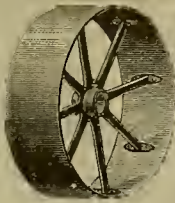
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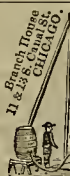
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We would call the attention of Assayers, Chemists Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

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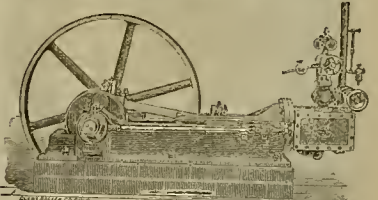
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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Sept. 27, 1888.

SILVER—The sudden advance in London, in which New York and San Francisco sympathized, was caused by Russia entering the market as a buyer for coining. Although not purchasing heavily, the movement was enough to cause large operators to take a hand, under whose buying the price was run up to a higher figure than for over a year past. With Russia withdrawing from the market, holders began to offer more freely, which caused a decline. In our market prices were advanced in sympathy with New York and London, but at the higher quotations business was slow. Yesterday and to-day there is more inquiry and sellers have no difficulty in placing any sized parcel at from 93 1/2 to 94 1/2.

Silver closed to-day at 93 1/2 c in New York. In this city holders asked an advance. London cables came through higher, but weak in the advance.

QUICKSILVER—The movement is of a steady character, but, as usual for the season of the year, light, although an increasing call is reported, due to the early resumption of crushing by many mills forced to idleness for the lack of water-power. Distant mining centers are beginning to draw more freely. The market is quoted at \$45 net cash.

PIG IRON—Importations have been very heavy, but the market absorbs all as soon as received, which causes importers to have confidence in the future. The market closed firm at quotations.

PIG TIN—The market for spot is inactive but firm. For forward delivery there is a fair inquiry, but sellers' firm views, it is said, restrict transactions.

PIG LEAD—The market has a firmer tone, but buyers fight against any advance. They only take freely when concessions are obtainable.

COAL—Importations the past fortnight aggregate over 50,000 tons, but even with this large arrival the market holds strong at full prices, owing to a continuance of the strike in the Australian collieries. The number of vessels en route from Newcastle is as follows: For this port, 17; for San Pedro, 2; for San Diego, 5. Total, 17, with a registered tonnage of 19,507, equal to a carrying capacity of about 32,000 short tons.

Eastern Metal Market.

By Telegraph.

New York, Sept. 27, 1888.—The following are the closing prices the past week:

	Silver.	Lead.	Copper.	Tin.
Friday.....	96 1/2	84 1/2	17 65	\$23 45
Saturday.....	96 1/2	84 1/2	17 65	23 50
Monday.....	94 1/2	80 1/2	17 65	23 60
Tuesday.....	94 1/2	80 1/2	17 65	23 60
Wednesday.....	93 1/2	80 1/2	17 65	23 70

The market closed as follows: Copper, dull; lead, steady; tin, moderately active and firm at a slight advance.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

COPPER—Dull, but a shade higher, spot closing at \$17.25. Transferable Notices (Lake) issued at \$—@—.

LEAD—Firm but quiet at \$4.95 @— spot. Transferable Notices issued at \$—@—.

TIN—Steady at an advance at \$23.20.

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Billiton Tin, @—; Banca Tin, @—; Baltimore Copper, \$16.65 @—; Orford Copper, \$16.00 @16.25; P. S. C. Copper, @—; Foreign Lead, \$5.00 @5.25; Foreign Spelter, \$5.40 @5.60. Antimony, \$9.75 @13.60.

The Philadelphia market is reported as follows by the New York Metal Exchange Report:

PIG IRON—The demand is quite active, and almost everything is held for higher prices. A few scattering sales are still reported at the old prices, but there is no doubt that the general market is firm with an advancing tendency.

MANUFACTURED IRON—Prices are all tending toward higher figures. The advance in raw material, and the liberal amount of orders on hand, cause sellers to feel that they must get more money for their products, hence a disposition to ask extreme figures on all new business.

OLD RAILS—Quotations from abroad come so much higher that sellers are afraid to name prices, but \$24 would probably be paid for the best.

SCRAP IRON—Bid of \$21 are made for cargo lots October or November shipments.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Sept. 27, 1888.	
ANTIMONY—French Star.....	13 @ 14
BORAX—Refined.....	74 @ 75
Powdered.....	74 @ 75
Concentrated.....	69 @ 70
COPPER.....	
Bolt.....	26 @ 27
Sheeting.....	26 @ —
Ingot.....	16 90 @ 27
Fire Box Sheets.....	— @ 26
IRON—Cleveland ton.....	— @ 25 50
English, 10.....	— @ 27 00
English, 16.....	— @ 31 00
American Soft, No. 1, ton.....	— @ 31 00
Oregon Pig, ton.....	21 @ 23 00
Clay Lane White.....	— @ 24 50
Shells, No. 1.....	— @ 29 00
Bar Iron (base price) @ lb.....	21 @ 3
LEAD—Pig.....	5 00 @ 5 25
Sheet.....	5 25 @ —
Shot.....	8 @ —
Pipe.....	1 75 @ —
Shot, discount 10% on 500 bag Drop, @ bag.....	1 55 @ —
Buck, @ bag.....	1 75 @ —
Chilled, do.....	1 95 @ —
Steel.....	16 @ 20
Black Diamond tool.....	10 @ 16
Pick and Hammer.....	8 @ 10
Machinery.....	4 @ 5
Toe Calk.....	44 @ —
TINPLATE—Coke.....	5 75 @ 6 50
Charcoal.....	5 75 @ 7 25
QUICKSILVER—By the flask.....	43 00 @ —
Flasks, new.....	1 05 @ —
Flasks, old.....	85 @ —

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING SEPT. 18, 1888.

389,734.—MICROMETER CALIPERS—James D. Bishop, S. F.	
389,639.—NUT LOCK—H. F. Corey, Alameda, Cal.	
389,641.—ASBESTUS PAINT—F. DeConinck, S. F.	
389,697.—FRUIT-GATHERER—C. A. and C. F. Fleming, San Jose, Cal.	
389,653.—ROLLER BEARING—R. W. Hent, S. F.	
389,703.—PERMUTATION LOCK—Chas. Hill, Los Angeles, Cal.	
389,659.—RIDING SADDLE—D. R. Lakin, Eugene City, Oregon.	
389,620.—TURN-TABLE FOR STREET RAILWAYS—J. W. Warhurst, S. F.	
389,623.—HORSE-POWER—W. H. Williscraft, Juniper, A. T.	

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MICROMETER CALIPERS—James D. Bishop, S. F. No. 389,734. Dated Sept. 18, 1888. This invention relates to certain improvements in devices for delicate measurements, and its object is to enable calipers for mechanical use to be adjusted with absolute precision to the smallest variations of measurement. It consists of a standard steel or metal rule divided to any desired scale, with a movable attachment eliding upon the scale, with grooves and set-screws facing right and left, the faces of the grooves being in the same vertical plane, and a spring-piece bent at right angles with the eliding piece, to which it is attached so that its edge may sink into any of the divisions of the rule and hold it in place. To the opposite end of the rule is fixed another metal piece having a movable portion with grooves corresponding to those on the first-named piece, and a micrometer or vernier screw by which it may be advanced or retracted.

FRUIT-GATHERER—George A. Fleming and Charles F. Fleming, San Jose, Cal. No. 389,697. Dated Sept. 18, 1888. This invention consists of a wheeled truck, wagon or sled, which may be or may not be provided with packing boxes for the fruit, and to which truck the gathering cloths are permanently secured. These cloths are attached to one side of the truck, and are adapted to be spread beneath the tree from which the fruit is to be gathered. There are two of these cloths, so that they may be spread on each side of the trunk of the tree. When spread beneath the tree, the tree is shaken and the fruit falls upon the cloths, and when all the fruit is shaken from the tree, the free ends of the cloths are lifted up higher than the edge of the truck, thus permitting the fruit to fall into the truck or the packing-boxes. The truck is then moved to the next tree, the cloths are respread, and so on until the gathering is completed or the truck is full. When not spread beneath the trees, the cloths are laid across the top of the truck, thus protecting the fruit from dust. This device being particularly designed for gathering prunes, the cloths are laid directly upon the ground, the prunes not being injured by falling.

THE FIRST CORLISS ENGINE—B. H. Thwait, in a lecture recently delivered in England, read the following letter from George H. Corlies, written a few days before his death: "The 17th of this February of 1888 is the fortieth anniversary of the starting of my first engine having the regulator combined with the cut-off valves, which was the first application ever made in practical form of this mode of regulation. This engine was of the walking-beam type, and was developing a capacity of 260-horse power during the first minute of its automatic regulation of the closing moment of its induction valve. It was constructed throughout with reference to the introduction of this new feature. The cylinder was 22 inches in diameter, and had a stroke of 6 feet, and worked under 60-pound hoiler pressure. This was my first effort, which has since culminated in giving the generic name to the Corlies engine."

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Nevada Queen, Sept. 22, \$20 300; Eureka Con., 21, \$17 200; Bluebird, 18, \$16 000; Tucarora, 21, \$3000; Hanauer, 20, \$1950; Germania, 20, \$2679; Hanauer, 21, \$3300; 22, \$2200; Germania, 23, \$4923; Hanauer, 23, \$3400.

W. H. GILBERT of New York is developing a coal mine at South Riverside. A shaft has been sunk to a depth of 240 feet, and the coal, according to experts, is of a very superior quality.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
Baltimore S M Co.....	Nevada.....	25, Sept. 22, Oct. 25.....	Nov 13, A R Grinn.....	402 Montgomery St	
Barr Divide M Co.....	California.....	25, Aug 13, Sept 17.....	Oct 1, D M Kern.....	340 Pine St	
Belcher M Co.....	Nevada.....	50 Sept 13, Oct 23.....	Nov 12, J Crockett.....	327 Pine St	
Bodie Com M Co.....	California.....	50 Sept 24, Oct 29.....	Nov 30, G W Sessions.....	399 Montgomery St	
Champion M Co.....	California.....	10 Aug 8, Sept 10.....	Sept 29, T Wetzel.....	323 Montgomery St	
Crispin M & M Co.....	Arizona.....	10 Sept 1, Oct 15.....	Nov 5, C B Krumm.....	323 Montgomery St	
Empire G M Co.....	California.....	25 Sept 19, Oct 22.....	Nov 5, A F Low.....	17 Nevada Block	
Exchequer M Co.....	Nevada.....	21 Sept 6, Oct 10.....	Oct 31, C E Elliot.....	309 Montgomery St	
Golden Piece G M Co.....	California.....	4, 60 July 31, Sept 8.....	Oct 1, W J Gleason.....	806 Market St	
Gray Eagle M Co.....	California.....	05 Sept 4, Oct 10.....	Oct 30, O H Bogart.....	327 Pine St	
Grass Valley M Co.....	California.....	15 Sept 13, Oct 22.....	Nov 12, A Halsey.....	323 Montgomery St	
Justice M Co.....	Nevada.....	25 Sept 25, Oct 31.....	Nov 19, R E Kelly.....	419 California St	
Locomotive M Co.....	Arizona.....	15 Aug 21, Sept 24.....	Oct 15, A H Fish.....	309 Montgomery St	
Lively Washington Com M Co.....	Nevada.....	25 Aug 21, Sept 23.....	Oct 16, L Oshorn.....	309 Montgomery St	
Live Oak D. it M Co.....	California.....	05 Aug 20, Sept 27.....	Oct 19, J Manlio.....	323 Montgomery St	
Lord of Lorn G & S M Co.....	Nevada.....	10 Sept 6, Oct 12.....	Nov 2, R N Van Brunt.....	18 Fremont St	
Mexican M Co.....	Nevada.....	25 Aug 9, Sept 13.....	Oct 3, C E Elliot.....	309 Montgomery St	
Mono G M Co.....	California.....	50 Sept 20, Oct 23.....	Nov 23, G W Sessions.....	309 Montgomery St	
Ophir S M Co.....	Nevada.....	50 Sept 1, Oct 4.....	Oct 24, E B Holmes.....	309 Montgomery St	
Pondere M Co.....	Nevada.....	05 Aug 10, Sept 11.....	Oct 10, J Stedfield Jr.....	309 Montgomery St	
Superior M Co.....	New Mexico.....	15 Aug 15, Sept 15.....	Oct 15, I C Stump.....	309 Montgomery St	
Tetrahart G M & M Co.....	California.....	12 Sept 8, Oct 8.....	Nov 3, W J Gurnett.....	308 Pine St	
Virginia Creek Hyd M Co.....	California.....	06 Aug 29, Oct 9.....	Oct 29, J M Quay.....	406 Montgomery St	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	Annual.....	Oct 8
Eureka Com M Co.....	Nevada.....	H P Bush.....	306 Pine St.....	Annual.....	Oct 15
Lone Jack M Co.....	California.....	J J Scoville.....	309 Montgomery St.....	Special.....	Sept 29
Nevada Queen M Co.....	Nevada.....	H Deas.....	309 Montgomery St.....	Annual.....	Oct 10
Paradise Valley M Co.....	Nevada.....	A Gilman.....	323 Montgomery St.....	Annual.....	Oct 20
Trinity G M Co.....	California.....	L Wadham.....	504 Kearny St.....	Special.....	Sept 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	50.....	Sept 11
Confidence S M Co.....	Nevada.....	A S Graham.....	306 Pine St.....	25.....	Sept 9
Eureka Com M Co.....	Nevada.....	H P Bush.....	306 Pine St.....	25.....	Sept 9
Grass Valley M Co.....	California.....	R W Heath.....	318 Pine St.....	25.....	Aug 27
North Star M Co.....	California.....	D A Jennings.....	401 California St.....	50.....	July 11
Hale & Norcross S M Co.....	Nevada.....	J F Lightner.....	309 Montgomery St.....	50.....	Aug 8
Idaho M Co.....	California.....	J J Scoville.....	309 Montgomery St.....	50.....	Aug 8
Pacific Borax, Salt & Soda Co.....	California.....	A H Clough.....	230 Montgomery St.....	1.00.....	July 10
Standard Com M Co.....	California.....	J W Pew.....	310 Pine St.....	05.....	June 12

Mining Share Market.

The mining share market has been so very dull and inactive for so long a time that few people interest themselves in it. What fluctuations occur are very small. The Virginia Enterprise says: Men of small means who have put their money into stocks are now being made sick by assessments. In trying to make a two-bit turn not a few among them have caught a four-bit assessment. Before people will go in with any sort of nerve, something must occur to send stocks up to a point where they will be above the level that makes a 50-cent assessment a factor—a thing to be feared and constantly borne in mind. When fluctuations amount to two or three dollars, dealers do not much bother themselves about an assessment of 50 cents, but at the present stage of the game a 50-cent assessment may etick a stock upon a man who does not want it, and who would much rather have his money in hand again.

This uncertain condition of the market will probably continue until the milling of ore is fully resumed by the several productive mines of the lode.

The indications at present are that milling will be resumed earlier than usual this season on the Caroon River. Already we have had a rain that gave life to the mountain tributaries of the Caroon river, and in that stream itself there was for a day or two a considerable flow of water—enough to have driven 20 stamps of the Eureka mill had it been thought worth while to start them up. The life given to the mountain tributaries they will not lose until there shall be other rains or snow. A few inches of snow in the mountains would mean business with the river mill.

The ore-producing mines are looking well, and in all, considerable bodies of ore are opened up ready for extraction.

During the time that the mills have been shut down much necessary repair work (as well as much work of exploration) has been done in all the leading mines. The drifts in the principal levels have been put in order and retimbered, and there have been repairs made to the main shaft.

A PECULIAR INDUSTRY—Among the various industries which are comparatively but little known beyond their specialty, that of the product of the castor bean may be mentioned as one of the most unique. The oil is especially adapted for lubricating all sorts of machinery, clocks, watches, etc., and it is an excellent lamp oil, giving a white light far superior to that of mineral oils, petroleum, rapeseed, linseed and all other oils, whether vegetable, animal or mineral; it also gives very little soot, and, all things considered, has been pronounced the cheapest oil known. All the great perfume of London and Paris use castor oil for the manufacture of golden oil, so well known for its property of keeping the head cool and the skin and its pores, as well as the roots of the hair, soft and open. The oil is used for textile fabrics to fit them for dyeing or printing, for which purpose the India dyers and printers invariably employ it, and it is one of the best oils for dressing tanned hides and skins of all kinds, on account of its imparting to them such a degree of strength, durability, tenacity and beauty. From the oil-cake, in addition to its other uses, a gas is obtained which gives a superior light, some of the stations on the East India railway being illuminated this way. The oil dissolves completely in alcohol, and this, incorporated with a solution of copal, makes a varnish which, it is said, is very useful in polishing all kinds of first-class furniture, carriages, picture-frames, cloths, canvas, etc.

HUNDREDS of lives were lost in the floods in the Province of Almeria, Spain, and many persons are ruined, their entire possessions having been swept away.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 6.	WEEK ENDING Sept. 13.	WEEK ENDING Sept. 20.	WEEK ENDING Sept. 27.
Alpha.....	1.30	1.45	1.50	2.00
And.....	1.40	1.50	1.70	1.60
Argenta.....	.90	.80	.60	.50
Belcher.....	3.45	3.60	4.40	5.50
Bodie.....	1.00	1.10	1.20	1.30
Bullion.....	.65	.60	.65	.65
Baltimore.....	.60	.60	.65	.65
Belle Isle.....	.40	.45	.40	.40
Bodie Com.....	1.45	1.65	1.50	1.40
Bodie Tunnel.....	1.50	1.50	1.35	1.15
Bulwer.....	.65	.70	.75	.65
Con. Va. & Cal.....	.84	.90	1.00	.90
Challenge.....	3.25	3.75	4.30	4.25
Champion.....	2.40	2.60	2.75	2.75
Chollar.....	1.04	1.11	1.12	1.12
Confidence.....	.30	.35	.40	.40
Con. Imperial.....	.30	.35	.40	.40
Columbia.....	.30	.35	.40	.40
Con. Eureka.....	.30	.35	.40	.40
Crown Point.....	3.65	3.75	4.05	4.15
Crocker.....	.70	.95	.80	.95
Central.....	.35	.35	.40	.30
Dudley.....	.....	.....	.....	.....
East B. & B.....	.....	.....	.....	.....
Eureka Con.....	.....	2.75	5.00	5.75
Exchequer.....	.80	.85	.85	1.00
Grand Prize.....	.65	1.00	.70	.65
Hale & Norcross.....	2.40	2.80	2.55	2.80
Hale & Norcross.....	4.00	4.40	4.15	4.60
Holmes.....	.....	.....	.....	.....
Independence.....	.....	.....	.....	.15
Iowa.....	.25	.35	.35	.35
Justice.....	.85	1.00	.95	1.00
Kentuck.....	.....	3.00	3.25	3.00
Lady Wash.....	.20	.20	.25	.15
Martin White.....	1.00	1.15	1.15	.75
Mexican.....	2.95	3.15	3.10	3.70
Mt. Diablo.....	.....	.....	.....	2.40
Northern Belle.....	1.50	1.55	1.40	1.50
Navajo.....	2.45	2.55	2.65	2.55
Nevada.....	.....	.....	.....	2.75
Niagara.....	.....	4.50	4.25	4.50
Nov. Queen.....	.....	1.10	1.25	1.10
North G. & C.....	.....	5.75	5.75	6.00
Occidental.....	.....	1.30	1.35	1.35
Overman.....	1.30	1.35	1.55	1.50
Potosi.....	2.35	2.60	2.55	2.70
Peerless.....	1.30	1.30	1.00	1.65
Piedmont.....	.....	.....	.....	.50
P. Sheridan.....	.....	.....	.....	.....
Silver Star.....	.....	2.50	2.65	3.15
Savage.....	2.10	2.50	2.65	3.05
S. B. & M.....	2.60	2.75	2.90	3.35
Sierra Nevada.....	2.85	3.05	3.10	3.35
Silver Hill.....	.45	.50	.50	.55
Silver King.....	.....	.....	1.50	2.10

The Debris Commission.

The debris question will be thoroughly investigated by a Government commission, notwithstanding the efforts of interested parties to prevent a proper examination of the subject. The bill appropriating \$100,000 for inquiring into the question in this State has passed and only awaits the President's signature to become a law. The bill is as follows:

Be It enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, that the Secretary of War is hereby authorized to detail three officers from the Engineer Corps of the United States, as a commission for the purpose of making an examination and investigation of the mining-debris question in the State of California, for the purpose of ascertaining whether some plan can be devised whereby the present conflict between the mining and farming sections may be adjusted and the mining industry rehabilitated; and for a complete examination of the injured navigable river channels, their tributaries and lands adjacent thereto, with a view to the improvement and rectification of said rivers; and that the sum of \$100,000, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of carrying into effect the provisions of this Act, said sum to be expended at the discretion of the Secretary of War, said commission to report as early as practicable to the Secretary of War the result of their investigation, and the Secretary of War shall make a report thereof to Congress.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Sampling Works for Sale.

The works are situated on A. & P. R. R., Calico Mining District, Daggett, Cal., and contain a first-class Engine and Boiler with Ore Crusher and other machinery, Platform Scales, Mill Scales, Assaying Outfit, etc., all nearly new. Also upon the premises an office building and a comfortable dwelling house (portable). The above can be had at a bargain. Apply to GILLESPIE & CHILDS, 123 California street, San Francisco.

Six men were arrested Monday near Tulare lake with a wagonload of venison. Twelve of the animals were found to be females. The prisoners were taken to Bakersfield, tried before Justice of the Peace Curran and fined \$518.

J. A. JOHNSON, 307 Montgomery street (the Nevada Bank building) is the general agent of the Stiles quartz machinery, and offers easy terms for introduction.

Books on Assaying.

BY C. H. AARON.

PART I.—Gold and Silver Ores.—Price \$1.

This new work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.

The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores") that have been "universally popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scorching; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Crucible Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 106 12mo. pages, with illustrations, well bound in cloth; 1884. Price, \$1, postpaid. Sold by DEWEY & CO., Publishers, No. 252 Market street, San Francisco.

PARTS II AND III.

Lead, Copper, Tin, Mercury, etc.

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O. H. BOGART, Secretary.
Office—327 Pine St., Rooms 9 and 10, S. F. Stock Exchange Building, San Francisco, Cal.

ASSESSMENT NOTICE.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, California. Location of works, Gold Hill Mining District, State of Nevada. NOTICE is hereby given, that at a meeting of the Board of Directors of the above-named corporation, held on the 6th day of September, 1888, an assessment (No. 4) of Ten Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 12th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Friday, the second day of November, 1888, to pay the delinquent assessment, together with costs of advertising and expense of sale. By order of the Board of Directors.

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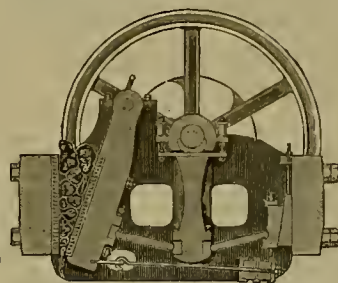
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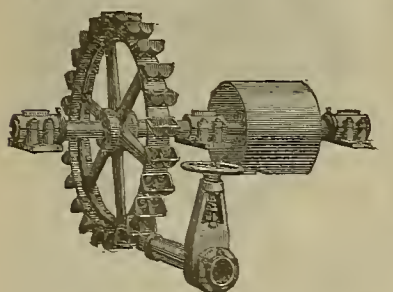
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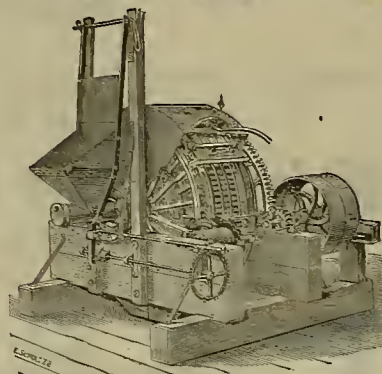
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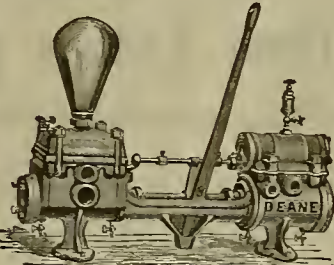
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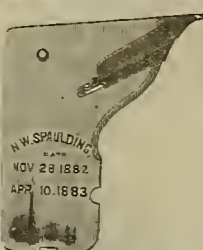
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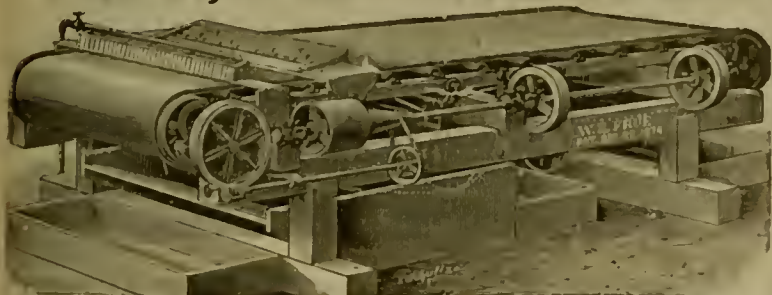
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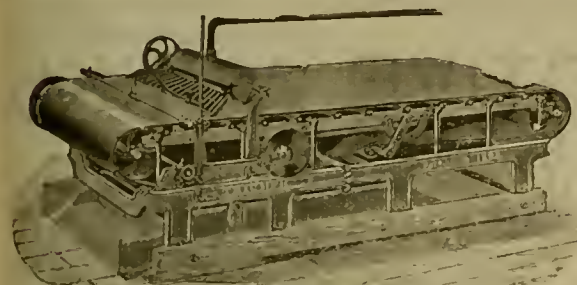
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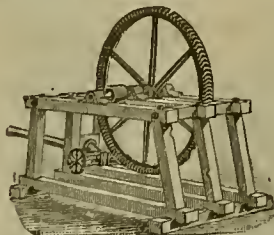
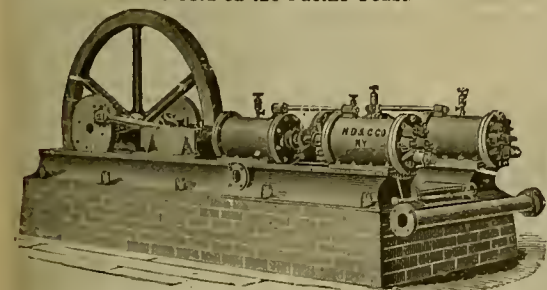
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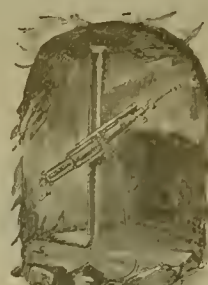


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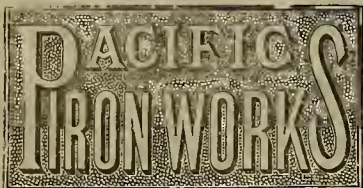
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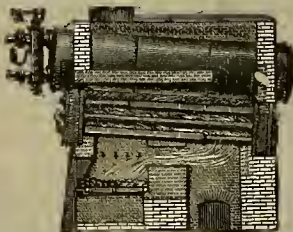
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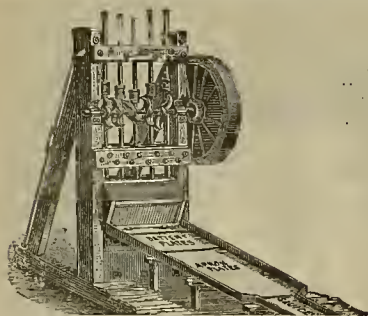
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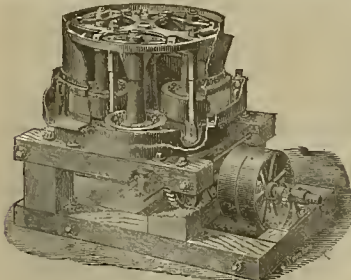
Centrifugal Roller Quartz Mills,

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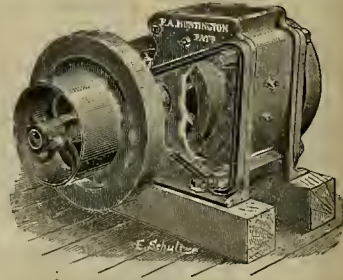
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An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, OCTOBER 6, 1888.

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Number 14.

Something About Elevators.

NUMBER 1.

There are probably few who are accustomed to frequent hotels and the large public buildings of our cities, and ride from story to story in the swift, silent elevator, have any idea of how short a time ago it is since these now indispensable conveniences came into general use. Although steam freight hoists have been known for half a century, it is only about five and twenty years ago since the first passenger elevator, or "vertical railway," as it was then called, was constructed for the Fifth Avenue hotel in New York, and later for the Continental hotel in Philadelphia.

These machines, which rendered both hotels famous for years, were very clumsy, and in appearance altogether different to the elegant cars that now adorn our various large establishments. Those who saw them years ago will remember that the middle of the car was taken up by a large vertical cylinder sheathed in wood. Inside of this cylinder revolved an enormous screw extending from top to bottom of the shaft, and in the threads of this, which were set at a low pitch, were engaged strong projections from the inside of the cylinder in the car, so that as the screw was revolved by the engine below, the car strung up upon it like a nut upon a bolt. This cumbersome and costly apparatus kept the field to itself for some time, until public opinion had so far changed that people were willing to trust their lives to the strength of wire ropes and enspined elevators. Being of moderate cost, their use rapidly spread until now there are few buildings without an elevator of one description or another.

The shaft as commonly constructed in this country consists simply of holes cut in floors, one above the other, and furnished with two upright timbers to serve as guides for the car. These posts are usually arranged for passenger elevators in opposite corners of the opening, as this gives opportunity for access to the car on all sides. For freight hoists of large size it is better to place them in the middle of the sides.

The guide timbers should be perfectly straight and plumb and of seasoned strength, for in case of accidents to the enspining ropes, which are always liable to happen from various causes, the whole weight of the platform or car is suddenly thrown upon them by the safety clutches, and any weakness of joints or crookedness in the timbers which should prevent the instant and effective action of these would insure its destruction.

Hard pine is very commonly used and is perhaps the best wood for the purpose. With regard to the posts, if 8x8 inches in section are too long for single eticke, they may with advantage be built up of 4x8-inch pieces, breaking joint in the middle of their length, and bolted. This will give a practically solid piece of timber from bottom to top of the shaft, independent of the floors, and is much better than the common construction of short lengths of whole timber huddled together and kept in line only by aid of the beams which surround the hatchway.

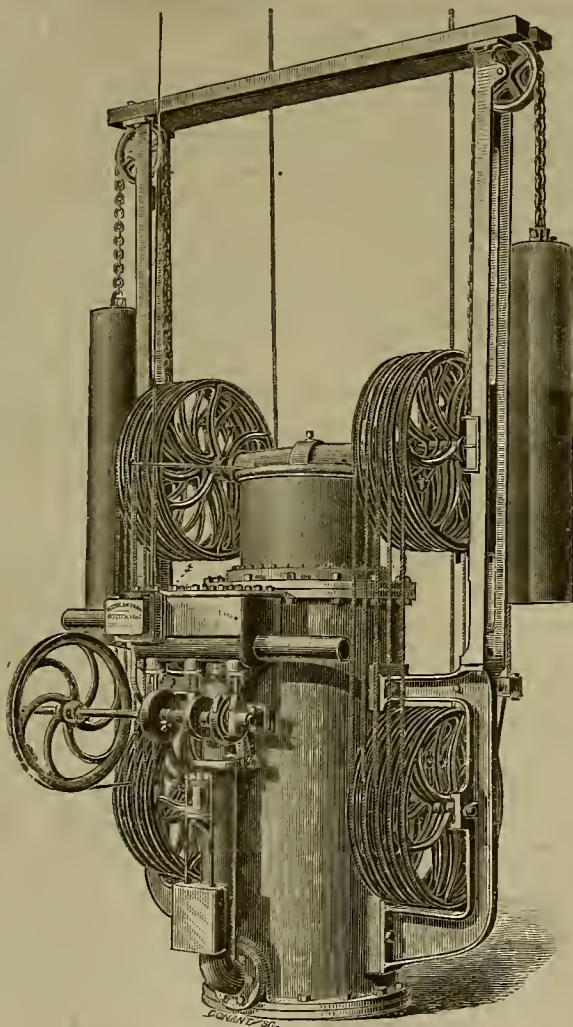
The San Francisco Tool Co. are the manufacturers of a patent hydraulic elevator of double capacity, as shown in the accompanying illustration. This hoisting machine is a double-acting hydraulic engine which makes one stroke while the car rises its full height. It has but one cylinder of cast iron, and one plunger and piston. The smaller machine is used only when

required at any part of the stroke and gives increased power. The cylinder is either horizontal or vertical. Two hoisting ropes attach to the car, and each rope has an independent connection and is attached to an equalizer, so that each bears its portion of the load. The stroke of the machine is generally one-tenth the rise of the car.

By using but one cylinder a saving in friction

has two different capacities, one for a heavy load and one for a light one, the water being divided into two parts by valve arrangement, and only used in quantity sufficient to supply the adequate amount of pressure for the load.

There is one other feature about the Tool Company's elevator, and that is its patent automatic lock or regulator, which prevents a waste of water, by avoiding the use of the larger



DOUBLE HYDRAULIC ENGINE FOR ELEVATORS.

is made, and also less complication of parts. The cylinder has a head at each end, which prevents the constant moisture around the machine from leakage when the packing of the piston becomes worn.

The valve chest is fastened to the cylinder, and has a cover which can be easily removed should an inspection of the valves be required.

The valves are of the poppet pattern with leather faces, which are held in place by rings which are screwed to the valves. They stand on bronze metal spindles, which are actuated by cams on a shaft, upon which is a shipper-wheel, to which the hand rope is attached.

The great thing claimed for the double capacity elevator is its economy in the use of water; it can be operated by water-pressure from the city main or from a tank in the upper story of the building.

It will be seen, then, that this make of elevator

capacity when the smaller capacity is sufficient for the load. The action being entirely automatic and dependent on the load in the car, it is impossible for an unskilled operator to waste the water by use more than is required.

The San Francisco Tool Co. also make a belt-hoisting machine for elevators, which is ingenious and effective. It is, however, dependent on steam for the motive-power and is generally driven by belts either from line or counter-shafts. The shaft has one tight and two loose pulleys, and the power is transmitted to the drum by means of a worm and gear which are inclosed in a cast-iron case of a self-lubricating character.

In concluding this brief description of this elevator, it may be proper to add that in planning a building the architect should carefully provide for everything connected with elevators when the plans and specifications are pre-

pared. He should decide at the outset just what he intends to recommend to his client and not leave such matters for after consideration. Thus all cutting and alterations will be avoided and it will not be necessary to modify or alter one kind of work in order to provide for another.

It is not the object to suggest the kind of operating machinery to employ, but this should certainly be decided early by competent judges, and when all is complete, a certificate that the work has been efficiently and properly carried out should be obtained from the architect before the work is paid for.

Lead and Silver Ores.

If the prices of lead and silver keep up for a while, or rise higher, many of the low-grade mines which have been closed down will again resume operations. Lead and silver have been quoted so low for such a long time that many miners had to quit work and others have been making nothing. The first effect of the gradual rise is shown in Salt Lake, where the smelters are now all busy. Ore is being crowded on the market and miners are in demand. Proprietors of smelting works interviewed by the *Tribune* of that city seem to be hopeful of even increased business.

A reporter asked Mr. McCornick how long he thought the business would hold up, and he said he thought there was no likelihood of any letting up until the prices on silver and lead declined. He said many of the low-grade mines had been shut down so long that it would take them some time to open up and begin shipping ore; hence he thought the supply would continue on the increase for some time yet. It was a healthful condition of affairs which would be a great benefit to the mining population of Utah and to business generally.

Mr. Jones said he had noticed a great increase in the supply, and also an increase in outside bidding for the ore who were endeavoring to run it out of the Territory. He did not know how long it would continue.

STAMPS AND POWER.—The system of wire-rope transmission of power to the California mill, says the *Virginia Enterprise*, is a positive success, and that mill will run 60 stamps steady and may possibly increase it to 80 stamps. The Brush Electric Company expresses confidence of being able to land 80 per cent of the power developed by the Pelton wheels in the Chollar shaft on the milling tools at the Nevada mill. This will assure the running of 60 stamps in that mill. The Brunswick's 76 stamps on the river have been put in good running order, and the Santiago's 25 stamps have also been repaired to stand a year of pounding. Then comes the Mexican, 44 stamps; Vivian, 16; Enreka, 60; Morgan, 40; Rock Point, 20; Gold Canyon mill, 30; Six-mile Canyon, 30; Alta, 10, and Justice 10—making a grand total of over 500 stamps, with an average crushing capacity of three tons each—or 1500 tons daily.

COAL is still and tending upward. Dealers express their conviction that this winter will see famine prices. The supply is very short. We receive on the average 50,000 tons a month from Australia at this port, and the strike there cuts off an important source of supply.

The Queensland mines have not come up to promise, and shares in England are at a discount.

Needed Mining Law Reforms.

When the honorable gentlemen who will constitute the next General Assembly of the State of Colorado have elected the United States Senator and completed the regular biennial wrestle with the railway lobbyists, there are two or three matters relating to the principal industry of the State which we hope may receive a little of their attention. One is a manner of regulating the working of mines in a way that will conduce to the health and safety of the employees. A second is the method of presenting expert testimony before courts, and a third is in relation to the establishment of a Mining Bureau and the appointment of a Commissioner of Mines.

There is need for something to be done in each of these directions. Every few weeks some miner is crippled or killed by an accident in a mine, which was caused by the neglect, ignorance or parsimony of the mine-owner or manager. He was only some poor, common laborer, whose friends are powerless to make any sensation in regard to the real cause of his death, and it goes on the record as one of the accidents incidental to and unavoidable in the miner's calling. If the State had an officer whose duty it is to examine the cause of such accidents and whose competency and honor would lead him to determine and tell the truth, without fear or favor, the public would occasionally learn some startling facts. As it is now, a coroner's inquest is seldom held, and when it is it often resembles a lawsuit in which there is an evident effort to hide something. There are numberless cases in Colorado mines where a score or several scores of miners are employed underground, with but one shaft through which they can reach the surface. A fire in the shaft-house would smother every one under ground in such mines. Certainly this is a risk that should be avoided whenever possible.

In the case of expert testimony, science is helied most shamefully. Under the present method of summoning expert witnesses, each becomes an advocate for the side employing him; and while he may not tell an untruth it becomes his interest to hide all the truth which is not favorable to the cause he is employed to assist. To present, as expert witnesses, the whole argument, pro and con, is not their recognized function. Expert testimony is now partisan; it should be judicial. Every one recognizes the evil, but it is not so easy to tell how best to remedy it. It might be best for the courts to appoint the expert witnesses, or at least to appoint some in addition to those appointed by each side, in order that court and jury could have some aid in forming an opinion from those who are unbiased and unprejudiced.

A mining bureau, whose duty it should be to collect and tabulate all obtainable information in relation to mines, mills, smelting works and process experiments, and to become in other respects like the Mining Bureau of California, would be of almost incalculable benefit to all who are interested in legitimate mining and who recognize the value of facts in relation to the business. It would not be of value to the dishonest mine-promoters and process frauds, and those whose interests are with them could not be expected to favor such a bureau.

There is a good deal, we well know, which can be said in opposition to such changes and regulations. They are almost all summed up in the statement that to carry out such measures would require the creation of new offices and the appointment of new officers, whose power would be great, and that dishonesty is so inherent in human nature that it is too much to expect any man would perform the duties fairly, without favor and without using his position to make money. Sugar-coat the objections as one may, these are what they are summed up in. If they are tenable then Widow Bedott told the truth when she said "we are all poor critters." But they are not tenable; the world is not all bad and there are a good many capable and honest men, though possibly the average legislator doesn't believe in any such a statement, which is not supported by observation of and acquaintance with his associates.—*Denver Mining Industry.*

THE QUALITIES OF A GOOD ROPE.—A German paper, in an article on the present methods of rope manufacture from hemp, and the determination of the different qualities and probable strength simply from the appearance, lays down the following rules: A good hemp rope is hard, but pliant, yellowish or greenish-gray in color, with a certain silvery or pearly luster. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibers were damp, and is, consequently, weak and soft in those places. Again, sometimes a rope is made with inferior hemp on the inside, covered with yards of good material—a fraud, however, which may be detected by dissecting a portion of the rope, in practiced hands, by its behavior in use. Other inferior ropes are made from short fibers, or with strands of unequal length or unevenly spun, the rope in the first case appearing woolly, on account of the number of ends of fiber projecting, and, in the latter case, the irregularity of manufacture is evident on inspection by any good judge. A very simple and extremely ready means exists for ascertaining the purity or otherwise of Manila hemp rope. This consists in forming balls of loose fiber of the ropes to be tested, and burning them com-

pletely to ashes. While pure Manila hemp burns to a dull grayish-black ash, Sisal leaves a whitish-gray ash, combinations of Manila and Sisal yielding a mixed ash resembling the beard of a man turning from black to gray.—*Iron.*

Electric Transmission in Mining.

The *Virginia Enterprise* says: The dynamos that are to be set up in the "electric chamber" on the Suto tunnel level of the Chollar mine to generate the current for use on the motors which will drive the machinery of the Nevada mill, are now arriving. The wires and motors are all here. The water-wheels that are to drive the dynamos are being manufactured by the Pelton Water-Wheel Co., San Francisco, and are liable to arrive here any day.

Six Pelton Wheels to be Used.

An alteration of the plan first talked of has been made at the suggestion of Capt. J. B. Overton. It was at first proposed to drive the six dynamos by means of a single large Pelton wheel, but it was soon after decided to give each dynamo its special driving-wheel. The wheels to be used are of phosphor bronze. Each wheel will be 40 inches in diameter, and, with a stream of water flowing through a nozzle less than half an inch in diameter under a vertical pressure of 1630 feet, will develop about 125-horse power, or 750-horse power for the six wheels. The Brush Co., who furnish the electrical apparatus that is to be used, says it will transmit 80 per cent of this power to the machinery of the mill. The apparatus is now being put in place, both underground and on the surface.

A New Thing in the History of Mechanics.

When in operation, their works will be of great interest to engineers and scientists everywhere. Never before in the history of mechanics has an attempt been made to run motor wheels under such an enormous pressure. Those who remember the terrible force with which water was spouted from leaks and breaks in the first big inverted siphon laid across Washoe valley (that put in by Schusler) will be able to comprehend the meaning of a pressure of 1630 feet.

Mechanics will readily see the advantages that will result from having each Pelton and dynamo independent of the others, instead of having all on one shaft and all run by a single water-wheel. When the new works are in operation in the big station on the Suto tunnel level, they will constitute

A Subterranean Lightning Factory.

The like of which is to be seen nowhere else in the world. It will be the next thing to drawing electricity from the molten interior of the earth. Hereafter tourists will not only wish to descend the C. & C. shaft and see at work there the Pelton wheels from which the power developed is transmitted to the surface, and thence to the pan-mill (1600 feet distant) by means of steel-wire cables, but will also wish to descend to this lightning shop deep in the bowels of the earth, and there see the transmission of the power of the water-wheels by electricity.

Mining Statistics of Queensland.

In 1886 the total yield of the Queensland gold-fields was 340,998 ozs. In 1887 the yield was 425,923 ozs, or an increase of 84,925 ozs. In the northern division in 1886 the Charters Towers and Cape field produced 144,379 ozs., out of a total of 195,185 ozs., and in 1887, 151,377 ozs., out of 225,234 ozs. The most promising field, however, was perhaps the Croydon, where a production of 2144 ozs. in 1886 increased to 31,788 ozs. in 1887. The gold produced in the central division increased from 57,031 ozs. in 1886 to 93,969 ozs. in 1887, this improvement being entirely due to the Rockhampton gold-field (Mount Morgan), of which the output advanced from 49,086 ozs. in 1886 to 85,305 ozs. in 1887. In the southern division the yield for 1886 was 88,782 ozs., and 106,720 ozs. in 1887. Gympie produced 88,000 ozs. in 1886 and 102,149 in 1887, while the small fields of this division produced only 1882 ozs. in 1886, against 4487 ozs. in 1887. Of the total gold raised in 1887, 404,223 ozs. were obtained by quartz crushing and 21,700 from alluvial workings. There was a gross total of 9305 miners employed, of whom 855 were Chinese, who were mainly employed in alluvial mining. The average yield in 1887 per ton of quartz crushed was 1 oz. 1 dwt. 12 grs. In 1886 there was a total quantity of tin raised of 3153 tons, value 162,124L., against 3279 tons, worth 217,389L. in 1887, when, however, the market price was higher. Of silver and lead, 1631 tons were raised in 1886, worth 52,797L., against 2153 tons, value 80,092L., in 1887. There were 110 tons of antimony raised in 1886, but none in 1887; while of copper 900 tons, worth 7000L., were produced in 1886, against 1010 tons, worth 7600L., in 1887. Finally we come to coal, of which 238,656 tons were raised in 1886, value 95,243L., and 238,813 tons in 1887, value 97,460L. There were 2629 miners at work in 1887 on minerals other than gold.

At Griffin, Ga., a colony of black bees had been living peaceably near a tribe of Italian bees for years until a short time since, when the black bees attempted to rob their yellow neighbors. A fierce fight was the result, in which hundreds of the black robbers were killed.

Steam Engines in the United States Fifty Years Ago.

Just one-half century ago, in 1838, says the *Engineering Journal*, a census of all the steam engines of every description in the United States was taken. The work was done in pursuance of a resolution of Congress, the object apparently being to secure information upon which could be based a law for the regulation of steam; and it was, in fact, shortly after that time that the first general law in relation to the use of steam-boats was passed. The census was taken by the collectors of customs in the different districts, and appears from the report which was submitted to Congress, a copy of which is now in our possession, to have been pretty carefully done. It is curious to look over the figures now, and to contrast them with some of those for the present year.

In his preliminary statement the Secretary of the Treasury says that full reports have been received from all the States except Mississippi and Tennessee, in which two or three districts were missing; and that they were somewhat imperfect from the States of Illinois and Arkansas, and the Territories of Wisconsin and Iowa. An estimate was made, which is probably a very close one, for the missing districts, in several of which it is considered that the absence of returns was due to the fact that there was nothing to return; that is, that there were no steam engines there.

The summary, including estimates, informs us that there were in the United States 800 steamboats, 350 locomotives, 1860 stationary steam engines, but these were very unevenly distributed. The largest number of the stationary engines in any one State was in Pennsylvania, where 383 were found, some of them in factories, a considerable number employed as pumping and hoisting engines in the coal mines, which were already beginning to be an important industry. Curiously Louisiana stood second among the States in her stationary engines, having not less than 274, or about one-sixth of the whole number in the United States. At first sight it appears strange that a State which has never been known for its manufactories should have had—at that early day—so many engines, but this may be explained by two causes: One, that a large number of small engines were employed on the numerous sugar plantations of the State for crushing cane and similar purposes, and another being that in so level a region there is almost an entire absence of falls which can be utilized for water-power. Thus in Massachusetts, which was considered at that time the leading manufacturing State, there were found only 165 stationary engines; but this is not surprising when we remember that a large portion of the mills were run by water-power. New York was fourth on the list, having 87, while Ohio had no less than 83.

A WONDERFUL GOLD MINE.—Leadville has for years been chiefly noted as a silver-lead camp, but the Antioch, which is now fairly opened, will make the yellow metal an important factor in the output of the famous camp. In speaking of this property the *Leadville Herald-Democrat* says: "The Antioch mill runs regularly, doing the usual good work, and the mine produces the ore for it without interruption. The ore body in the Antioch mine is so immense that the 100 tons per day which are taken from it apparently makes very little difference. The ore is of low grade, but the enormous quantity makes the mine so valuable. The ore in the Antioch is probably mined cheaper than in any other mine in this country west of the Mississippi river. In the Antioch the principal cost is in the loading of the ore upon the cars and tramping to the surface. Some new cars of special design have just been ordered for the mine, which will make this part of the work easier and cheaper. The ore is broken from a breast 60 feet high and 50 feet wide. On the average, 200 tons of ore are dislodged at one firing. Now and then as much as 1000 tons and even 1500 tons have been broken down at one time. The ore is broken by a series of holes drilled 20 feet deep; they are loaded with No. 2 dynamite and fired by electricity. Experiments have been made with various kinds of powder. Black powder was found not to be so efficient as dynamite, because the quality of the porphyry rock was variable, and the slow black powder blew out the softest parts, and of course did not shatter the rock like dynamite. The great stope in the Antioch is carried directly to the surface, which is stripped of the wash and gravel. Two lines of snow fences have been built on the surface to protect the pit from snow in the winter. The walls of the vein are nearly vertical, and so far seem to stand without timber. In mining the Antioch ore there is no cost for timber, none for hoisting and none for pumping, which are three of the great items of expense in the operation of most mines. The Antioch should have a larger mill, and if this were built it would probably be one of the largest producing gold mines in this country."

FREIGHT ON ORES.—The reduction of shipping rates on ores shipped from Wood river has proven a great boon to that rich section of Alturas county. Last spring most of the mines of those districts were shut down, and the owners declared positively their intention of keeping work suspended until they were placed on an equality with Montana points as regarded

freight rates. Their plan proved successful, the railroad company yielding. As a result, many mines resumed working as soon as the new rates were announced, and several hundred miners were immediately put to work. From 100,000 to 200,000 pounds are now shipped daily from Bellevue, Hailey and Ketchum; everybody wears a bright smile and signs of prosperity are becoming manifest. The number of ore-producing mines in the Wood River country and on Smoky is very large, and when they are properly opened so that they can be worked to more advantage, Alturas will be a great lead and silver producing county. The success of mining in Alturas will not only add wealth to the Territory, but attract the attention of mining-men to other rich mineral districts and hasten their development.—*Idaho World.*

Right to the Use of Water.

The *Legal Adviser* gives its readers some information respecting water rights, which has been a source of great trouble and much litigation. It is a general principle, says the writer, that every owner of land upon a natural stream of water has a right to use the water for any reasonable purpose not inconsistent with a similar right in the owners of the land above, below, and opposite to him. He may take the water to supply his dwelling, to irrigate his land, or to quench the thirst of his cattle; to use it for manufacturing purposes, such as the supplying of steam boilers, or the running of water-wheels or other hydraulic works, so long as such use does not sensibly and injuriously affect its volume. But this is a mere privilege running with the land, not a property in the water itself.

Where the stream is small and does not supply water more than sufficient to answer the wants of the different proprietors living on the stream, none of the proprietors can use the water for either irrigation or manufacturing, but for domestic purposes and watering stock, one proprietor will be justified in consuming all the water.

Twenty years' use adverse to the right of another will give the person so using the stream the right to continue the use, regardless of the other's rights.

And as to the division of water, every one who owns land situated upon a stream has the following rights:

1. To the natural flow of the stream.
2. That it shall continue to run in its accustomed channels.
3. That it shall flow upon his land in its usual quantity, natural place and usual height.
4. That it shall flow off his land upon the land of his neighbor below, in accustomed place and at its usual level.

These rights he has as an incident to the property in his land, and he cannot be deprived of it by grant or description.

If any one shall make any change in the natural flow of a stream to the material injury or any interference shall prevent the stream-owner situated upon it, or by any form flowing as it was wont to flow, he is responsible for the damage he may occasion. These rights are subject to the privilege of each one to make a reasonable use of the water upon his own land while it is passing along the same. It matters not what the source of the water may be, whether it be back-water or the flowage of the same, or the water of another stream. Still, a division of a stream may be made by any one if it be returned to its natural channel before it leaves his premises.

THE GOLD AND SILVER MINES OF BOLIVAR.

In addition to being a rich agricultural and forest region, the department of Bolivar, United States of Colombia, is destined to become famous for its mines of gold and silver. A number of mines that were worked by the Spaniards, and of which all traces were lost, are being rediscovered in various parts of the department, notably in the district of Morales, near the town of Simiti, the extreme southern part of Bolivar. Many quartz mines are worked in this district, but in the most primitive style, the natives using huge wooden mortars and pestles. Some of the richest mines are located near the town of Simiti, in Morales, a place that has already 3000 inhabitants, and, in view of the recent discoveries, is rapidly increasing. The mines of Simiti were worked by the Spaniards as early as 1764, and, according to authentic history, yielded rich returns. Among the most notable of these mines is one called Bijao. It is situated only five miles from Simiti. This quartz mine is destined to again become famous, its present owners being an enterprising corporation, now engaged in making roads, building bridges and houses to facilitate the development of the property. Altogether, quite a number of mines have been located in this section, and a large amount of capital has been invested in their acquisition and operation. Simiti is about 300 miles distant from the ports of Carahagena or Barranquilla. A steamer can be taken from either of these ports to Bodega Central on the Magdalena river. From there a transfer is made to a smaller steamer, which takes about six hours between Bodega Central and Simiti.

As usual at this time of the year the weather prophets are abroad predicting the early advent of the rainy season; also, that it will be late, the signs favoring both conclusions, according as they are interpreted.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

I.—Total Mill Expenses of Various Mills While Using the Russell Process.

Table XXXVI gives the total mill expenses per ton of roasted ore in the Cusi mill for nine months, while using the old or ordinary leaching process, the Russell process, and both processes together (mixed months). The total expenses, including assaying, crushing, drying and stamping, roasting, leaching, roasting and refining of the sulphides, and production of bullion 980 fine, while using the Russell process, were \$12.08.

At Parral, also in Mexico, the total expenses for the treatment of tailings from ore which had originally been roasted, and leached by the ordinary process, were \$2.10 per ton for 40 tons per day. For roasted ore at the rate of 10 tons per day, the total expenses were \$9.15.

It should be observed that the expenses at Cusi much exceed, are indeed probably double, what they would be in a well-constructed mill in the United States.

In Table XXV the Cusi expenses are taken as a basis, from which are deduced the corresponding expenses for acid-roasted ores and raw ores in the United States.

The Cusi mill, however, was built so as to utilize, in part, old plant, and to work San Bartolo ore by the ordinary process. It was ill adapted, particularly in roasting and dust-saving facilities, for economical work on the hater San Antonio ore, by any process, and in its leaching department was unsuited to the Russell process. The \$12.08 on which the estimates are based is the average mill expense per ton while using the Russell process. In the second estimate of Table XXV, the reduction in cost, due to improvements in arrangement and construction, amounts to 30 per cent.

TABLE XXV.

COMPARISON OF TOTAL MILL EXPENSES PER TON OF ORE IN THE UNITED STATES AND MEXICO, BASED ON ACTUAL EXPENSES AT CUSI.

FIRST ESTIMATE.

Total mill expenses for Cusi ore and mill if the same ore and mill were in the U. S.

Actual total mill expenses of Cusi (see Table XXXVI).....	\$12.08
Deduct for difference in cost of salt and chemicals.....	\$2.54
Deduct for difference in expense due to shipping instead of refining prod.....	.03
Deduct for difference in cost of supplies, other than salt and chemicals.....	.60
Estimated expense per ton of ore.....	\$8.91

SECOND ESTIMATE.

Total mill expenses for Cusi ore in a well-constructed 75-ton roasting mill in the U. S.

Total mill expenses for Cusi ore and mill in the U. S. (see last estimate).....	\$9.01
Deduct for difference in cost of running 1 Stetefeldt as compared with 3 Howells.....	\$1.00
Deduct for difference in expense due to substitution of 6 50-ton for 22 9-ton leaching tanks.....	.65
Deduct for difference in expense due to increase of capacity from 55 tons to 75 tons.....	.80
Estimated expense per ton of ore.....	\$6.50

THIRD ESTIMATE.

Total mill expense for dry crushing, raw-leaching mill in the United States.

Total mill expense for Cusi ore in a well-constructed 75-ton mill in the U. S.	\$5.50
Deduct cost of chloridizing, salt and difference in amount of chemicals per ton.....	\$2.40
Estimated expense per ton of ore.....	\$3.10

In a well-constructed raw-leaching mill, the total mill expenses per ton for 75 tons per day should not exceed \$3 per ton, and under favorable circumstances would fall as low as \$2.50, particularly if the crushing were done by rolls instead of stamps.

At Silver Reef, Utah, the total mill expense, including also assaying and general expense, was \$1.65 per ton for raw tailings, at the rate of 40 tons per day, and \$3 to \$4 for raw ore, at the same rate per day. The corresponding expenses for 75 tons per day would be about \$1.25 for raw tailings, and about \$2.85 for raw ore.

For roasted ore, at Lake Valley, the total mill expenses for 60 tons per day were estimated by the general manager, Mr. Hadley, at \$4.65 per ton, including assaying, etc.

V.—Applicability of the Process.

A.—Values of the Materials Treated, in Gold, Silver and Lead.—Table VI gives the average values of all the tailings and raw and roasted ores on which the Russell process has been or is now in use. The values of the tailings, in silver, range from 8 to 12 ounces, of raw ore 14 to 15 ounces, and of roasted ore 12 to 88 ounces per ton. In gold, the value has been from 0 to \$5 and \$6 per ton. In lead, the range is from 0 to 23 per cent; ore containing the latter proportion having been treated at Cusi, and also at Somherete.

B.—Special Applicability to Ores Containing Lime, Antimony or Arsenic.

The superiority of alkaline-roasted, as compared with acid-roasted, ores in regard to amount of chemicals required per ton, has already been illustrated.

So far as extraction by hyposulphite solution is concerned, the most desirable elements

which can be present in material which is to be roasted, are antimony or arsenic, or both of them, in combination with the silver; since, in that case, both antimoniate and arsenate of silver are formed during the roasting, both of which are soluble in the leaching solutions. Of the two elements, arsenic is the most desirable, not only because arsenate of silver is about 3.57 times as soluble by a given weight of hyposulphite as antimoniate of silver, but also because the solubility of arsenate of silver is increased 2.4 times by the presence of caustic alkali, while that of antimoniate of silver is raised only one-sixth. The latter peculiarity causes the presence of arsenic, in combination with silver, to be particularly desirable in the treatment of alkaline-roasted ores.

On account of the solubility of antimoniate and arsenate of silver in the leaching solutions, some ores can be roasted entirely without salt, and still yield a high percentage by the Russell process (as at Yedras and Ontario).

The Solace ore in Idaho, from which nothing can be extracted in the raw state, yields 92 per cent after an instantaneous (or 5 seconds) roasting without salt in the muffle, on account of the presence of arsenic and antimony.

C.—Special Applicability, Either With or Without Concentration, to the Treatment of Raw Ores.

The advantages in favor of raw leaching as compared with leaching after roasting are as follows:

1st. The cost of plant for raw leaching is much less than that required for a treatment which includes roasting.

2d. Less power and less labor required in handling.

3d. No losses or discrepancies due to dust or volatilization in roasting.

4th. No salt.

5th. No acid, and less chemicals required for leaching.

6th. Less water, the amount per ton averaging only one-fourth to one fifth that required for roasted ores.

The practicability of raw treatment depends upon the value of the ore, supposing the percentage extraction to be the same for raw ore of different values. For instance, for a well-arranged mill, the losses occurring in the treatment of raw ore would probably be about 1 per cent, in addition to the loss in tailings, from the time the ore enters the mill up to and including the production of dried sulphides. In a roasting-leaching-mill the corresponding losses would be, probably, about 3 per cent.

In expenses, the advantages are in favor of raw leaching by about \$3 per ton. If the ore to be treated, therefore, has a value of 20 oz. per ton, 73 per cent extraction by raw leaching is equivalent to 90 per cent by roasting and leaching. But if the ore has a value of 50 oz., the extraction from the raw ore must be 82 per cent, to be equivalent to 90 per cent by roasting and leaching.

The great difference between the result by the ordinary and by the extra solution, on raw ore, is illustrated in the case of some ores lately experimented upon by Mr. F. M. Watson, superintendent of the Somherete mill. These results were as follows:

Name of mine.	Value in ounces.	Per cent extracted in assay office.	
		By ordinary.	By extra.
Buena Vista.....	60.0	25.0	70.0
San Geronimo.....	219.0	2.8	81.1
Penoles.....	38.0	8.0	86.0

If, however, the tailings from leaching, as is frequently the case, contain the precious metal also in such a combination as to admit of concentration, a combined leaching and concentration will frequently be more applicable than roasting and leaching, even though the leaching alone may not yield more than 30 or 40 per cent of the value of the ore. The additional cost of concentrating the tailings from the leaching will seldom be more than 50 to 70 cents per ton. When leaching and concentration are combined, if the concentration is by the wet method, it must follow the leaching; since, if it preceded, the result would be a separation of the slime and coarse ore, which would make the leaching practically impossible on account of the mechanical difficulty of introducing the leaching solutions into or of removing them from the ore.

D.—Applicability to Tailings from Amalgamation or from the Ordinary Leaching Process.

The Russell process extracts silver compounds which cannot be extracted by amalgamation. This is shown in the case of raw tailings at Silver City, New Mexico, which had already been treated twice by amalgamation, and once by concentration, and from which amalgamation, even in assay-office tests, would still extract only 22 per cent, while the extraction by the extra solution was 72 per cent.

Also at Silver Reef, Utah, the raw tailings, which had already been twice treated by amalgamation and from which practically nothing could be extracted by amalgamation, yield 40 to 80 per cent by treatment with the extra solution. This is in spite of the fact that the Silver Reef ores, from which these tailings were produced, are the only raw ores, so far met with, which yield a higher percentage by amalgamation on the first treatment than by the extra solution, although the expenses are less for the latter.

At the Minas Prietas, in Mexico, the extrac-

tion from the raw ore by amalgamation in a Bess mill, is 76 per cent of the gold, but only 9.2 per cent of the silver. The extraction from the tailings by the Russell process is 54.6 per cent of the gold and 30 per cent of the silver.

E.—Applicability of the Process to Dry or Remote Regions, or Where Salt is Expensive.

The amount of chloride of silver present in an ore is practically immaterial so far as the results of the extra solution are concerned. This was particularly noticeable at the Ontario, on roasted ore, the mill extraction by the extra solution, on ore with a very low chlorination, being 34 ounces per ton more than could be extracted by the ordinary solution, even in the assay office (the extraction by the latter representing approximately the amount of silver present as chloride). Also at Yedras, the extra solution in the mill extracted as high as 25 ounces per ton more than could be extracted by the ordinary solution even in the assay office; and the difference was much greater if mill results were compared. At the Ontario, the mill results by the extra solution, on ore roasted with no salt, were only 4 per cent less than by amalgamation on ore roasted with 18 per cent salt, and on ore roasted with 9 per cent salt were 3.5 per cent higher than by amalgamation on ore roasted with 16 per cent salt. Hence the Russell process can be used on ore with a very low chlorination, or on ore chloridized with less salt than would be necessary if the ordinary process or amalgamation were to be used. The applicability of the Russell process to remote regions is illustrated by the fact that over 90 per cent of the leaching plant, in bulk and weight, is of wood and can be constructed wherever wood can be obtained.

Its great applicability to dry regions, as compared with amalgamation, is shown by the fact that in the treatment of roasted ore leaching requires only one-sixteenth as much water as amalgamation, and in the treatment of raw ore only one-thirtieth as much as amalgamation.

VI. Comparative Applicability of Various Roasting Furnaces to the Preparation of the Ore for the Process.

A.—Effect of a Very Short Muffle-Roast, With Free Exposure to Air and Heat, on the Extraction and Loss of Silver by Volatilization. Table XXVI shows the effect on Yedras ore of a very short roasting in the muffle. In these experiments the ore crushed in the battery through a 26-mesh screen was sifted quickly, or spread in a thin layer on an earthenware dish and exposed in the muffle to a medium red heat. The table illustrates the fact that, as far as the extraction by the extra solution is

TABLE XXVI.

EXPERIMENTS ON VERY SHORT TIME OF ROASTING. RESULTS OF ASSAY-OFFICE LEACHING TESTS, YEDRAS ORE.

No. of charge.	Mesh of screen.	Per cent of salt.	Per cent extracted by ordinary assay office.	Per cent extracted by extra in assay office.	Difference per cent.
116	10	7	32.5	84.1	51.6
117	10	7	37.7	80.0	42.3
118	10	7	37.0	65.8	28.8
119	10	7	32.7	69.5	36.8
120	10	7	32.7	69.5	36.8
121	10	7	32.7	69.5	36.8
122	10	7	32.7	69.5	36.8
123	10	7	32.7	69.5	36.8
124	10	7	32.7	69.5	36.8
125	10	7	32.7	69.5	36.8
126	10	7	32.7	69.5	36.8
127	10	7	32.7	69.5	36.8
128	10	7	32.7	69.5	36.8
129	10	7	32.7	69.5	36.8
130	10	7	32.7	69.5	36.8
131	10	7	32.7	69.5	36.8
132	10	7	32.7	69.5	36.8
133	10	7	32.7	69.5	36.8
134	10	7	32.7	69.5	36.8
135	10	7	32.7	69.5	36.8
136	10	7	32.7	69.5	36.8
137	10	7	32.7	69.5	36.8
138	10	7	32.7	69.5	36.8
139	10	7	32.7	69.5	36.8
140	10	7	32.7	69.5	36.8
141	10	7	32.7	69.5	36.8
142	10	7	32.7	69.5	36.8
143	10	7	32.7	69.5	36.8
144	10	7	32.7	69.5	36.8
145	10	7	32.7	69.5	36.8
146	10	7	32.7	69.5	36.8
147	10	7	32.7	69.5	36.8
148	10	7	32.7	69.5	36.8
149	10	7	32.7	69.5	36.8
150	10	7	32.7	69.5	36.8
151	10	7	32.7	69.5	36.8
152	10	7	32.7	69.5	36.8
153	10	7	32.7	69.5	36.8
154	10	7	32.7	69.5	36.8
155	10	7	32.7	69.5	36.8
156	10	7	32.7	69.5	36.8
157	10	7	32.7	69.5	36.8
158	10	7	32.7	69.5	36.8
159	10	7	32.7	69.5	36.8
160	10	7	32.7	69.5	36.8
161	10	7	32.7	69.5	36.8
162	10	7	32.7	69.5	36.8
163	10	7	32.7	69.5	36.8
164	10	7	32.7	69.5	36.8
165	10	7	32.7	69.5	36.8
166	10	7	32.7	69.5	36.8
167	10	7	32.7	69.5	36.8
168	10	7	32.7	69.5	36.8
169	10	7	32.7	69.5	36.8
170	10	7	32.7	69.5	36.8
171	10	7	32.7	69.5	36.8
172	10	7	32.7	69.5	36.8
173	10	7	32.7	69.5	36.8
174	10	7	32.7	69.5	36.8
175	10	7	32.7	69.5	36.8
176	10	7	32.7	69.5	36.8
177	10	7	32.7	69.5	36.8
178	10	7	32.7	69.5	36.8
179	10	7	32.7	69.5	36.8
180	10	7	32.7	69.5	36.8
181	10	7	32.7	69.5	36.8
182	10	7	32.7	69.5	36.8
183	10	7	32.7	69.5	36.8
184	10	7	32.7	69.5	36.8
185	10	7	32.7	69.5	36.8
186	10	7	32.7	69.5	36.8
187	10	7	32.7	69.5	36.8
188	10	7	32.7	69.5	36.8
189	10	7	32.7	69.5	36.8
190	10	7	32.7	69.5	36.8
191	10	7	32.7	69.5	36.8
192	10	7	32.7	69.5	36.8
193	10	7	32.7	69.5	36.8
194	10	7	32.7	69.5	36.8
195	10	7	32.7	69.5	36.8
196	10	7	32.7	69.5	36.8
197	10	7	32.7	69.5	36.8
198	10	7	32.7	69.5	36.8
199	10	7	32.7	69.5	36.8
200	10	7	32.7	69.5	36.8

concerned, the operation of roasting requires not more than five seconds, if each particle of the ore is freely exposed to the heat and furnace gases at the same time, and that the loss in silver under such circumstances is practically nothing. On the other hand, deeper layers of ore roasted for half an hour to an hour showed a loss of 11 to 20 per cent, and in the case of concentrates as high as 40 per cent. In the experiments in Table XXVI, all the roasted ore was assayed, so that the determination of the percentage lost required no calculation. A still higher extraction in the same time was obtained on Solace ore, but no record of the loss of silver in these experiments was preserved. The above are the only two ores on which the quick roastings have so far been tried.

B.—Effect of Various Sizes of Crushing on the Furnace Results.

Table XXVII compares the Stetefeldt, Howell, reverberatory, and Bruckner furnaces as the results of using various sizes of screen.

The table shows that the Stetefeldt furnace gives about as good results with a 16 as with a 20-mesh screen, and the Howell with a 12 as with a 26-mesh, but the reverberatory gives a

little better results with an 8 than with a 16 or a 30 mesh, although the coarse part alone does not give as good results as the fine part alone. With the Bruckner, the change from a 26 to a 10-mesh produces very little difference in the results. The table also gives the percentage of salt used in each case. The Ontario ore is of higher grade than the others, and has therefore a little more salt.

C.—Differences in Extraction (Between Ore From Furnaces and Ore From the Cooling Floor or Vaults.

The cooling floor or vault samples are the only ones which can be taken as a standard of comparison for furnace-work. Evidently if the percentage of extraction decreases as soon as the ore leaves the furnace, a high extraction from samples taken in the furnace counts

TABLE XXVII.

EFFECT OF DIFFERENT SIZES OF CRUSHING ON THE ROASTING IN VARIOUS FURNACES.

Name of mine.	Kind of furnace used.	Mesh of screen.	Value of ore, per ton.	Per cent of salt.	Place from which sample was taken.	Per cent extra traction by extra solution in assay office.
Ontario.	Stetefeldt.	30	75.1	12.9	Cooling floor.	94.0
"	"	26	75.1	11.7	"	97.0
"	"	20	75.1	13.1	"	97.0
"	"	16	75.1	10.0	"	94.1
"	"	12	75.1	10.0	"	94.1
"	"	10	75.1	8.0	"	91.9
"	"	8	75.1	7.0	"	90.5
"	"	6	75.1	7.0	"	88.3
"	"	4	75.1	7.0	"	88.3
"	"	3	75.1	7.0	"	88.3
"	"	2	75.1	7.0	"	88.3
"	"	1	75.1	7.0	"	88.3
San Antonio.	Howell.	30	47.0	10.0	"	94.1
"	"	26	47.0	10.0	"	94.1
"	"	20	47.0	10.0	"	94.1
"	"	16	47.0	10.0	"	94.1
"	"	12	47.0	10.0	"	94.1
"	"	10	47.0	10.0	"	94.1
"	"	8	47.0	10.0	"	94.1
"	"	6	47.0	10.0	"	94.1
"	"	4	47.0	10.0	"	94.1
"	"	3	47.0	10.0	"	94.1
"	"	2	47.0	10.0	"	94.1
"	"	1	47.0	10.0	"	94.1
San Miguel.	"	30	53.0	10.0	"	94.1
"	"	26	53.0	10.0	"	94.1
"	"	20	53.0	10.0	"	94.1
"	"	16	53.0	10.0	"	94.1
"	"	12	53.0	10.0	"	94.1
"	"	10	53.0	10.0	"	94.1
"	"	8	53.0	10.0	"	94.1
"	"	6	53.0	10.0	"	94.1
"	"	4	53.0	10.0	"	94.1
"	"	3	53.0	10.0	"	94.1
"	"	2	53.0	10.0	"	94.1
"	"	1	53.0	10.0	"	94.1
Combarbada.	Beverly, rotary.	30	35.9	10.0	"	90.5
"	"	26	35.9	10.0	"	90.5
"	"	20	35.9	10.0	"	90.5
"	"	16	35.9	10.0	"	90.5
"	"	12	35.9	10.0	"	90.5
"	"	10	35.9	10.0	"	90.5
"	"	8	35.9	10.0	"	90.5
"	"	6	35.9	10.0	"	90.5
"	"	4	35.9	10.0	"	90.5
"	"	3	35.9	10.0	"	90.5
"	"	2	35.9	10.0	"	90.5
"	"	1	35.9	10.0	"	90.5
Yafipa.	Buckner.	30	64.9	7.0	"	86.9
"	"	26	61.7	7.0	"	86.9
"	"	20	61.7	7.0	"	86.9
"	"	16	61.7	7.0	"	86.9
"	"	12	61.7	7.0	"	86.9
"	"	10	61.7	7.0	"	86.9
"	"	8	61.7	7.0	"	86.9
"	"	6	61.7	7.0	"	86.9
"	"	4	61.7	7.0	"	86.9
"	"	3	61.7	7.0	"	86.9
"	"	2	61.7	7.0	"	86.9
"	"	1	61.7	7.0	"	86.9



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Saturday Morning, Oct. 6, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Something About Elevators; Lead and Silver Ores, 221. Passing Events; California's Multiform and Vast Store of Mineral Products; Prospecting in Alaska; Publicity of Mining Facts, 224. Sinking Natural Gas Wells; Bridging the Willamette at Portland; Agricultural Title to Mineral Lands, 225.

ILLUSTRATIONS.—Double Hydraulic Engine for Elevators, 221. Details of Leaching Plant for the Russell Process, 225.

CORRESPONDENCE.—Needed Mining Law Reforms; Electric Transmission in Mining; Mining Statistics of Queensland; Steam Engines in the United States Fifty Years Ago; Right to the Use of Water, 222. The Russell Process, 223. The Kootenai District, 227.

MECHANICAL PROGRESS.—Recording Rail Vibrations; A Greater than Keely; Ninety-five Miles an Hour; Slipping of Belts; Abandoning Natural Ores; The Largest Castings; Burnishing Steel by Electricity; Wire Shoe Soles; Locomotive Shops; A Novel Flat Iron, 226.

SCIENTIFIC PROGRESS.—Underground Waters; An Immense Meteorite; Electrolytic Production of Magnesium; The Sea Bottom Between San Diego and Honolulu; Snow from a Clear Sky; Hydrogen Gas; Walking vs. Arm Exercise; Dumping During Distillations; Essence of Birch, 226.

USEFUL INFORMATION.—An Egg Shell; The Music of the Ancients; To Raise Opium; Utilizing the Waste of Sawmills for Paper Pulp; Japanese Cats and Dogs; Preserving Fish Alive; Breeding Rattlesnakes; A Good Rule in Riding on an Elevator; A New Process of Drawing on Wood; Mortar that Will Stand All Sorts of Weather; Keeping Off Frost from Coffee Plants; Two Fredericks; Large Sunflowers, 227.

GOOD HEALTH.—Health of the State; Vacation Victims; Edison and the Yellow Fever Germ; The Use of Water on the Scalp; Hardening Children; How They Disinfect Florida Mails; Speed of Motors, 227.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 228-29.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 236.

Business Announcements.

[NEW THIS ISSUE.]

Gold Prospect Wanted—I. H. Mayer & Co.
Telephone—F. M. B., Springfield, Ohio.

See Advertising Columns.

Passing Events.

Latest news from the Yukon River region, Alaska, does not appear so encouraging as was hoped. The miners who have returned from there after prospecting the region conclude the difficulties are too great to allow mining to pay. A very short season, great distances to travel, uninhabited country and frozen ground, discouraged them from continuing work.

The mining community on this coast will be glad to know that the President has signed the Chinese bill, which prohibits all Chinese laborers from coming to the United States.

The finding of a good supply of natural gas in Marysville at a depth of 278 feet is a very important thing for that section of the State. No doubt other wells will be bored. In other parts of the State wells are being sunk in the hope of finding natural gas.

In the more mountainous and colder regions of this coast those miners who are "forehanded" are doing their assessment work for the year. This is much more sensible than leaving it until the last day of the year.

The President has signed the bill authorizing the appointment of a Government commission to examine into the debris question in this State, and we may now expect a thorough examination of the subject by impartial men.

California's Multiform and Vast Store of Mineral Products.

We have more than once, we have, in fact, very often, taken occasion to speak in these columns of the great abundance and diverse forms of California's mineral and metalliferous resources, and recur now to the subject for a special reason: Up till quite recently, with all this store of natural wealth, we have been able to turn very little of it to practical account, and that because we had for these commodities no available market. Being cheap and bulky, they would not bear long and costly transportation, and, with the limited population on this coast, only a few of them were here in much or any demand, none being in large requirement. And so, products that in other advanced countries would have led to the establishment of new industries and new sources of income, have here been neglected or been drawn upon only to the extent of supplying our narrow domestic wants, and not always even that far.

In so overlooking this class of our resources we have sometimes been charged with a lack of enterprise and thrift; and while the charge at first sight seems specious enough, it is without foundation in fact. Under the circumstances, our people have very often undertaken too much in this direction. Many of them in their premature efforts to utilize these mineral substances have been heavy losers, and that for the reason mentioned. Thousands and even millions of dollars have been lost in these industrial ventures. The pioneer endeavors to deal here with petroleum, graphite, manganese, antimony, sulphur, borax, asbestos, mica, marble, soda, chromium, and iron, not to mention other of these cheap commodities, which cost us dearly; the most of these efforts having in the first instance turned out pecuniary failures, nor have more than a few of them proved eminently successful. And this we say, not that these early trials are to be deprecated, nor yet that the outlook in this direction is now discouraging, but to show that our people have not been indifferent to their natural advantages, nor guilty of even a seeming lack of thrift.

But this is all of the past. In recurring to the subject in hand, it is our purpose to consider it with reference to the vastly changed conditions in store for us—conditions that await us on the threshold of the future. California has, within the past few years, received large accessions to her population. During the next few years these accessions will be swollen to much larger proportions—so large that she will, within the coming decade, be able to count her inhabitants by millions. When this shall happen we will reverse the rule that has elsewhere generally obtained, and instead of increasing our imports we will diminish them by making or producing more of the articles required for home consumption at home. As soon as the domestic call for an article becomes sufficient to warrant the erection of works to make it in a large way, such works will be erected, it being, of course, generally understood that anything to be made economically and efficiently must be made on a large scale. When this era, now so close at hand, shall have arrived in California, it will so expand this class of our industries as will cheapen while it perfects their products. Then all the commodities enumerated, and many more, will be turned out here in quantity ample for home needs, with much to be spared in the shape of exports to other countries. When the Bay of San Francisco shall be looped with cities and hamlets and villas, and the whole country shall be dotted with factories, farm-houses and homes, there will be need for much cement, plaster, lime, marble and freestone, with the precious onyx for interior ornamentation and decoration. When we shall have a hundred miles of streets to be paved and sidewalks to be curbed, where we have now scarcely one, then will the demand for granite, asphaltum, basalt and cobble be in proportion. As railroads and shipbuilding are extended, and the thousand other uses of iron are increased, there will arise a necessity for opening and working the deposits of that ore so abundant in this State. And so of our mineral paints, fire-clays, deposits of graphite, soda, and innumerable other products in this line.

Let us be accused of overestimating this class of our resources, it may be stated that of the 52 counties into which California is divided, not one is without mineral deposits of recog-

nized economic value. Even San Francisco, the smallest county in the State, can point to more than one product of this kind. In thirty of the above counties gold is being mined with success, and in ten both gold and silver. In two of these counties borax, in two salt, in three copper, in four quicksilver, and in a like number petroleum are all being produced on a large scale and with profit. Large beds of iron ore of a superior kind are found in five or six counties, and deposits of coal, a tolerably good fuel and suitable for making steam, in as many more, the most of these latter being now worked. Lead, chromium, antimony, graphite, gypsum, hydraulic cement, chalk, ochre, mica and asbestos all have a place among our useful metals and minerals, the most of them occurring in the greatest abundance. We have at least one valuable deposit of tin and may have more. The useful clays and building stones abound in all parts of California, many of these deposits being extensively worked.

The forthcoming report of the State Mineralogist will be to most people a revelation in this respect. It will appear from that document that many counties in this State heretofore classed as purely agricultural, being called in derision "cow counties," have the mineral kingdom largely represented within their borders. Closer inquiry than had before been made, or was indeed practicable, brings to light much that is new as well as highly useful in this connection.

In so far as supplying her rational, or even possible, wants, California is an empire in herself, and when her system of future industries comes to be established, she will show herself more nearly self-supporting than any other country in the world. As she is now sending her agricultural staples to so many other peoples, so will she buy-and-by her sending them her mineral products as well. We cannot now measure or even guess what may be their kind or extent. But as we have so often been surprised in these particulars, so may it be expected that there are other surprises in store for us, though whence they will come, or what shape they will take, none can divine.

Prospecting in Alaska.

The miners who went up the Yukon river, Alaska, this season, to make their fortunes in the placer mines, appear to have had a hard time of it without getting much gold. Eighteen of them arrived at this port on the U. S. steamer Rush, this week. The U. S. steamer Thetis found a party of 72 miners at the mouth of the Yukon, who had drifted down the river, and had no other means of transportation from that place. The vessel brought them to Ounalaska, and the Rush brought 18 from there. The others will come down on the Thetis.

According to the story of the returned miners, which we publish in our "mining summary," on another page, the deep frozen ground prevented prospecting or mining. Each man, however, got \$26 for six days' prospecting, so there must have been considerable gold there when that much was obtained under the difficulties mentioned. The men met other miners, who had traveled in other parts of the country, but who were discouraged by the prospects.

As we have mentioned in previous numbers of the PRESS, Alaska is no place for poor men to go to. The country is sparsely inhabited; there are few towns; no roads. The season is short, and provisions are very high. Transportation is nearly all done by canoes, heavy timber and swamps obstructing the way on the land. The men who have first returned are all disappointed, and tell stories of hard-up and high prices which will deter others from going next season.

CAPITAL has been secured in New York to complete the ditches, etc., for the Osceola Gravel M. Co., Osceola, Nev. The money is to develop the property in good shape, bring in water, etc. The water supply has heretofore been too scant for successful operations.

MACHINERY for a 20-stamp mill is being packed in on mules to Humboldt canyon, Placer county. The mine for which it is intended belongs to Jas. G. Fair and Mr. Davis.

THE ORE from the Brunswick mine, Nevada county, has not yielded up to expectations, and the mine has been attached.

Publicity of Mining Facts.

The early days of mining on this coast were characterized by speculation and stock gambling rather than by legitimate mining. One of the greatest aids to stock gambling was power to suppress any facts concerning the property. The public were only allowed to know so much of the business of the company and of the state of affairs in the mine and reduction works as suited the purpose of the controlling manipulators. Quite naturally employees became secretive, for the price of their positions was silence—in fact no one outside of the chosen few knew anything whatever of the actual state of affairs. From custom it has become habit, and the annual reports made by the directors of mining companies to the stockholders are little more than an account current. Such a statement may be amply sufficient so far as an understanding of the financial state of affairs is concerned. If it were the custom of directors to give to the stockholders an annual report of the work of the year embodying the results of any trials of mechanisms or processes, whether they were successful or not, together with such information concerning the cost of production as is ordinarily required by manufacturers, and an outline of the regime to be pursued for the coming year—of course the directors would be expected to withhold any information the publicity of which would impair the company's profit—if, as we say, such were the custom, directors would not only be doing their duty by the stockholders, but in the case of many companies they would positively do the company a benefit. Giving publicity to experiments with mechanisms or processes brings them before engineers generally.

An engineer might have charge of a copper property, but, while reading of the failure of some silver-mining company to make some particular piece of mechanism or metallurgical operation work successfully, he might be able to see their difficulty and solve their problem. Again, giving publicity to failures—and we particularly say failures, for it is the making successes of failures where the gain is to come—brings the difficult problems to the notice of professional men connected with public institutions. These men have, generally, more time and facilities at their command for minute investigation, hence they could very often solve problems that would otherwise, for a time at least, remain unsolved. Engineers and the mining profession generally are, as a rule, liberal in giving publicity to valuable discoveries and free in criticism; give them problems to work out; do not suppress your failures.

THE ACADEMY OF SCIENCES.—A meeting of the Academy of Sciences was held on Monday evening, Dr. Harkness, president, in the chair. The Librarian reported an addition of 75 books to the library and a donation of a number of mammals was received by the cabinet. Dr. Eccles of the Torrey Botanical Club addressed the scientists present on "The Importance of Botany and Its Advantage to the Community," after which Mrs. Mary K. Curran, curator of botany of the Academy, read by proxy a paper on the trees and shrubs of the Sierra Nevada. The paper was compiled from the observations of a recent trip made by the writer to the region described. The Board of Trustees had a meeting on Monday afternoon to hear the report of the special committee who have the proposed new building in charge. Architects were chosen and plans discussed.

OUR MINERAL PRODUCTS.—Dr. David T. Day of the Division of Mining Statistics of the United States Geological Survey estimates the value of all the mineral productions of the country for the past year, including petroleum, natural gas and other inorganic substances, at \$538,056,345. Of this, pig iron amounted to \$121,925,800; silver to \$53,441,300; gold to \$33,100,000; copper to \$21,052,440; bituminous coal to \$98,004,654; anthracite coal to \$84,552,181; and building stone to \$25,000,000. The mineral product for the year is the largest in the history of the United States, and the largest mineral production ever reached by any country.

THERE are over 1,000,000 pounds of coke stored on the platform of the Old Dominion Copper Co., says the *Wilcox Stockman*, thus insuring work for freighters for several months to come.

Sinking Natural-Gas Wells.

Various theories have been advanced to the origin of natural gas. There has been knowledge of its existence for ages, but it has only been brought into use in the past 20 years or so to any great extent. It is now used in many places like ordinary coal, but it is much better fuel for iron, steel and glass manufacture. One of the great difficulties in obtaining gas from alluvial deposits, such as clay or sand, is that it is very hard to keep back the water. In the central part of Illinois the farmers have used gas for many years in their houses, the gas being found at about 130 feet deep. This gas vein lies in a bed of gravel, having a covering of hardpan and blue clay, and below it the same substance. This hardpan consists of gravel cemented together by the organic substance in the water, and it is harder to drill than ordinary stone. By repeated heavy blows this crust is broken. Immediately underneath it lies a heavy bed of water, and great skill has to be exercised not to cut through it when sinking for gas.

The gas-driller, as a rule, is not a driller for water. His knowledge is a great deal different; he drills for gas; shuts off the water that he comes in contact with. If he does not, and the hole is full of water while drilling, the weight of the water is so great as to shut off the gas and prevent its coming up the top. It is, therefore, absolutely necessary that good tight casing should be used in shutting off the water as each water stratum is reached. The well may be sunk by the hydraulic process, as it washes the veins cleaner than by the dropping process, and whenever gas is struck it will bubble up in the water and show itself. You cannot smell it. It is agreed by all geologists and gas engineers that gas exists in any formation of rocks where there are seams or cavities and the rock is porous and not full of water. It has been clearly demonstrated that gas is found in the following formations of rock, and there is no doubt but that it exists in all organic substances of the earth when there is a reservoir to retain it, and the conditions are favorable for holding it. It has been found in the sandstone formation, in limestone, soapstone, blue, red and yellow clay, conglomerate-rock, hardpan, and in the alluvial deposits in coal strata.

At Galveston, gas bubbles out from a sand-bed 800 feet deep, and as the water is discharged on top of the ground it rises out of the water and burns like alcohol, with a blue flame. There are many regions where gas exists, but on account of the water stratum which lies above the gas-bearing strata, and the means that has been used in drilling, water has been allowed to run down into the gas and shut it off.

For example, if a stratum of gas was reached at 1000 feet, and the drill-hole was full of water, it would require a pressure of over 500 pounds to force the water out of the hole. Gas having apparently no weight in the air, its pressure would be the same on the surface as it would be in the bottom of the hole, but the weight of the water would be in proportion to the depth of the well. Approximately two feet of water would equal a pressure per square inch of one pound. That is near enough to convey the idea to the practical well-sinker.

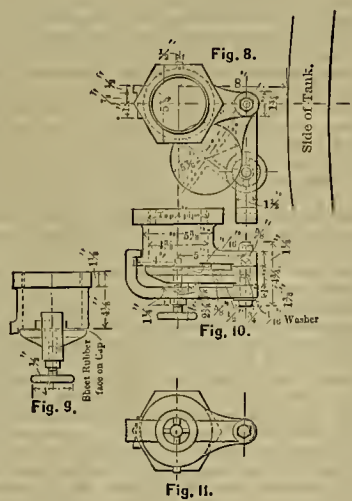
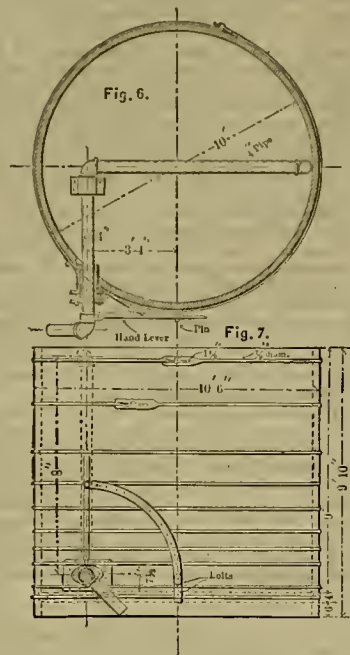
Those who have had experience advise those who contract to sink wells for gas under no circumstances to get the work done by the foot, or so much money for the job, whether gas is found or not, as the driller has but one object in view, and that is, to make the hole to the desired depth and draw the money for it. To sink a well properly requires great care, and sometimes the work is very discouraging on account of mishaps and the shutting off of water veins, as often a very few feet of drilling, after water is reached, gas may also be reached and lost by bad management on the part of the driller.

The best illustrations of perfect and imperfect work are the wells drilled in the oil and gas regions, where wells are sunk within 100 feet of each other where on an average one-half are failures. It seems as if wells sunk and drilled properly should yield correspondingly. There is another difficulty in drilling wells, and that is, in keeping them properly cleaned. If sunk with a dull drill, and the detritus is allowed to accumulate in the well, it will form a substance almost like plaster, and cement up the crevices in the rock or slate, as it is being penetrated, thoroughly stopping them up.

These facts we gain in reading a little illus-

trated pamphlet on "Natural Gas and Oil," published by the American Well Works of Annona, Ill. The treatise contains illustrations and descriptions of the tools and appliances used in this kind of work. The subject is one of great interest in California just now, where so much prospecting for oil and gas is going on. The company has published several other treatises, none costing over 25 cents. They are all on kindred subjects, such as diamond boring, prospecting apparatus, well-sinking appliances, earth-boring machines, well sinking, wind engines, etc.

LEACHING PLANT.—On this page are given cuts showing some of the details of plant for the Russell leaching process. Fig. 7 is the precipitating-tank; Figs. 8, 9, 10 and 11, gate for dis-



DETAILS OF LEACHING PLANT FOR THE RUSSELL PROCESS.

charging sulphides; Figs. 14 and 15, detail of filter; Figs. 16, 17, 18 and 19, discharge pipes for the various tanks. These are described fully in the article now being continued in the PRESS. In our number of Sept. 22d, pages 190-191, will be found a portion of the description.

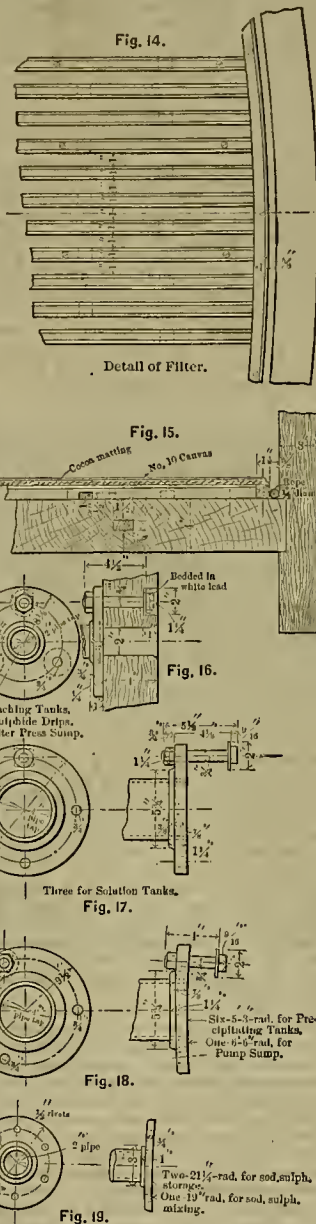
STEEL CARS.—The telegraph of Tuesday reports that a company has been organized to manufacture railway cars constructed entirely of sheet steel, under the patents of C. W. M. Smith of this city. The company, it is also reported, is negotiating for a large tract of land near Chicago on which to erect a factory. It is claimed the new vehicles can be built as cheaply as wooden coaches.

The Carlisle Company, N. M., for the last seven months, crushed 26,700 tons of ore, yielding in gold bullion \$195,000, and 2270 tons of base concentrates. The smelter is in continual operation. The company's payroll is \$16,000 per month.

WM. CHURCH, for many years resident manager of the Detroit Copper Co. of Morenci, Arizona, has resigned and gone to Denver.

Bridging the Willamette at Portland.

Our Portland (Oregon) correspondent writes that the Morrison-street bridge across the Willamette river, connecting Portland and East Portland, is proving a tolerably remunerative enterprise. Its construction was strongly opposed by ship and steamboat owners, who claimed that it would be an obstruction to commerce. The work was enjoined, and after \$35,000 was expended the enterprise lay dormant for some time. At last the injunction was raised. The bridge was built at a cost of \$200,000. It is high enough above the water to admit of the passage beneath of many of the smaller steamers and tugs, but has a long draw with nearly 50 feet clear space each side of the abutment, to allow the passage of high-



masted vessels. There is a street railway across the bridge, and it is a means of communication which is being more and more used between the two Portlands. It paved the way for the iron railway bridge built a short distance below, and this will undoubtedly be followed by other bridges in the near future. The present bridge has been open to travel since April 12, 1887. It has a system of tolls too complicated to mention in this item. We apprehend that some day the two city corporations will see to it that this, and other bridges yet to be, shall be made absolutely free to the public.

THE MINING DEBRIS PROBLEM.—Among the various bills approved by the President on Tuesday last was one for the investigation of the mining debris question in California.

A PLANT of Bellows' electric process for rendering refractory ores "free milling" is to be set up at Silver City, New Mexico, by Colonel John M. Wright.

SEVERAL of the mining companies of Honduras are yielding good monthly returns of auriferous silver bullion.

Agricultural Title to Mining Lands.

NUMBER II.

In the PRESS of last week the method adopted of obtaining agricultural title to mineral lands was described, and it was stated that we should follow up the subject and give the miner's position on that part of the question relating to prosecution where claimants had made false statements concerning the nature of the land. The reasons why the miner does not prosecute for perjury are:

1. The expense of such a suit would be even greater than those involved in opposing the homestead claimant's "final proof."

2. Conviction would be impossible except in very flagrant cases, because the claimant and witnesses are only required to swear to the best of their knowledge that no valuable mineral deposits are existing on the premises, and that in their opinion the land is more valuable for agricultural than for mineral purposes; and a man can hardly be convicted of perjury for expressing a mere belief or opinion.

3. The miner has to prove beyond doubt that his claim is really valuable, which means, or is construed to mean, a *dividend-paying* claim. Such, at least, has been the ruling at Sacramento, we understand, in contested cases of this kind. By this ruling the miner's right of possession, granted to him by the law of Congress, allowing him the fractional part of the year in which his location was made, and the whole of the next following year, and requiring only a yearly expenditure of \$100 a year thereafter to develop and prove the value of his claim, is wholly set aside. It is well known that mining claims, and particularly quartz lodes, often require an expenditure of large sums of money, as well as years of time, to develop and establish them on a paying basis, and that even the best and most valuable mines at times will not pay the actual expenses of working them.

4. There is no difficulty in the agricultural claimant obtaining from men of his own class all the affidavits he requires to the effect that the land is more valuable for agricultural than mining purposes, while the miner, even if he endeavors to show to the contrary by producing the certified copy of location of a bona fide mining claim upon the premises, is required to prove as above that the location is valuable.

Now it frequently happens that no sooner has the homestead claimant's final proof been accepted; when he has paid for the land and received his duplicate, and when the land is closed and lost to the prospector, that he, the claimant, suddenly becomes aware of the mineral value of his land, and is ready and willing for a consideration—generally one-third of the find—to allow the miner to prospect ledges or old mines, which were known to exist on the land, but from some cause or other were not actually worked at the time final proof was offered. In other instances the agriculturalist busies himself in holding and selling as valuable mineral property the land he has but lately acquired under agricultural title.

It will readily be seen how glaringly unjust is the present condition toward the man who is honestly endeavoring to comply with the law and who is averse to acquiring a title to his mining ground by perjury. At most he can obtain by mineral patent only 20.65 acres, and hence making his application he must show an actual outlay in development of not less than \$500. Add to this the cost of survey, attorney's fees, etc., which seldom amount to less than \$400, and in contested cases very much more; also \$100 to the Government for the land. Besides this there is generally a vast amount of annoyance and loss of time from the precautions exercised by the local land offices and afterward at Washington, so that it is extremely difficult for a poor man to acquire a patent title to his mine. But land of exactly the same character and nearly eight times as large is acquired through fraudulent homestead and preemption movements up at but a small part of the cost of a single quartz patent, and with the slightest possible trouble and complication. This is being generally seen in California, and is producing on the one hand much dissatisfaction among honest men in the mining communities, and on the other hand greatly adding to the number of the unscrupulous by offering so easy a method to acquire the absolute title to large bodies of mineral lands. It is our purpose to still further refer to this subject on another occasion.

MECHANICAL PROGRESS.

Recording Rail Vibrations.

M. Conard, one of the leading engineers of the Lyons railway, in France, has been conducting, for the past five years, very extensive experiments for the purpose of ascertaining the state of a railroad track during the passage of trains. With the apparatus designed by him for the purpose he has succeeded in obtaining graphic charts of the flexion and lateral thrust of the rails, and the inclination of the ties under the varying strains of passing loads of different magnitude. The apparatus used by M. Conard was quite similar to that used in physiological researches for the determination and registration of animal vibrations of various kinds. An explorer of small size was placed upon the rail to be studied, and all the motions received were transmitted to a transcribing device, placed at a sufficient distance from the track to be beyond the influence of its vibrations. The transmitting part of the apparatus is a simple rubber tube inclosing compressed air, and it is the variations in pressure caused by the displacements of the explorer that act upon the transcribing apparatus.

The explorer is a sort of bellows, consisting of a small round metallic box, closed by a sheet of rubber, to the center of which is fixed a rod whose rounded head bears against the rail. A spiral spring fixed to the bottom of the box repels the rubber and prevents the box from flattening without external stress. In the bottom there is a small tubulure, to which is fixed a rubber tube connecting with the transcribing apparatus. The receiving and transcribing apparatus embraces a bellows quite similar to that of the explorer, but the rubber diaphragm carries a very light goose-quill style that inscribes the displacements upon a cylinder covered with lampblack. The blackened cylinder that constitutes the registering apparatus is driven by a clockwork movement, the uniformity of whose movement is regulated by a Foucault pendulum. It may be given three different velocities through appropriate gearings, or be stopped instantaneously. The inscriptions are taken upon the blackened paper that covers the metallic cylinder and are afterward fixed by immersion in photographic varnish. Regularity of motion being highly essential for the exact determination of the speed of trains, this is accomplished by means of a tuning fork whose motions are kept up by an electric current.

With this apparatus M. Conard had noted interruptions amounting to 100 per second, but the apparatus is so sensitive that it is said to be capable of inscribing 1000 or even 1200 vibrations per second. The graphically recorded data secured by M. Conard permits of a very thorough analysis of the complex motions and strains of rails.

A GREATER THAN KEELY.—Another revolution in motive-power promised. The *Scientific American* of a late date says: Several newspapers have referred to a new invention by one William Timmins, which, if successful, will revolutionize motive-power. The inventor is an unpretentious English mechanic residing in Pittsburgh, Penn., who claims to have invented a machine by which united motive-power can be stored or used without the expenditure of fuel. The story goes that he has been engaged for years in perfecting the invention, and is now negotiating with the Governments of England, Russia and the United States for the sale of the right to use his discovery, which, if after examination it proves to be what it claims, will revolutionize the motive-power of the world. He claims to be able to create a pressure of 20,000 pounds per square inch—more than sufficient to propel the largest ocean steamer afloat, or to move 80 laden freight cars in one train. The machine seems to be simply an air compressor of the simplest sort. It consists of one small cylinder (six-horse power), with a balance weight of 75 pounds, which runs the entire apparatus; another small cylinder, five inches in diameter, with seven inches' stroke, compresses the air into a tank from which the power is utilized. Under the piston-plate the inventor has placed two layers of bars containing 11 different minerals, the magnetic influence of which is the secret of the invention. The advantages he claims are durability, economy and simplicity. Experts have examined the machine and pronounce it a success. In submitting his design to the Governments named, Mr. Timmins claims that the pneumatic generator can not only be applied to war vessels as a motor, but can be used as a defense against hostile attacks by means of air chambers placed behind the armor plating.

NINETY-FIVE MILES AN HOUR.—It is said by the *Philadelphia Ledger* that an application has been filed by a New York civil engineer for a patent for a locomotive and tender designed for making faster time than has ever been made in this or any country. The boiler is rectangular in shape, having a large and permanent area of evaporating surface, supported by a great extent of heating surface, the pressure at its weakest points. The cylinders are in the rear of instead of between the truck wheels, and the fire-box is supported between the center of gravity of driving-wheels. All the combinations of parts are in exact harmony, and it is intended to easily make the time of 60 miles an hour with 10 coaches, and can, without violent

strain, be brought to 95 miles an hour with the same load. This gain in performance over the present machine is obtained by a mechanical construction with reference to the distance between the rail centers upon which it is supported, and is the first application made which has embraced and specified every portion of a locomotive and tender constructed mathematically with reference to the limits within which they must be confined and supported. As a result of exact proportion with reference to such base, the cost of maintenance will be greatly below the general average of present constructions.

SLIPPING OF BELTS.—A writer on slipping of belts says that though a radical remedy consists in keeping the belt pliable, so as to hug the faces of the pulley, this is not always feasible; the belt may be softened by neatfoot oil or by castor oil. Siccative oil, like linseed, is unfit for a leather belt, as it has an affinity for the oxygen of the atmosphere and reverts to its acid base, which is injurious to the leather. According to this writer, a ready remedy for a slipping belt consists in the powder known as whiting, sprinkled sparingly on the inside of the belt, this being the least harmful of any similar application. Powdered resin is bad, as it soon dries the leather and cracks the belt, while it is difficult to get it out of the leather, whereas whiting may be wiped off or washed out with water. Again, the use of water on belts, preliminary to oiling, is good—the belt to be washed on shutting down at night, or, what is better, after the close of work on Saturday, and the oil then applied when the belt is partially dry, but in no case should a belt be washed or oiled while stretched on the pulleys. It is asserted that if iron-faced pulleys were always lagged with leather there would be but little slipping of belts, but in many cases the slipping is due to too much strain on the belt. There is also economy in running wide belts; that is, wider than is the usual practice.

ABANDONING NATURAL GAS.—One by one the manufacturers in the Ohio valley are abandoning the use of natural gas and returning to coal, because of its irregular supply and the extortionate price demanded. The gas companies may find before long that it takes two parties to make a bargain. While the people have been to a great expense putting gas in their factories and dwellings, and would regret to forego the use of gas, they will not stand imposition or extortion. They were assured that gas would be furnished at or below the cost of coal, but the prices charged last year were fully 20 per cent in advance of coal, and now it is proposed to advance the rate to private consumers 33 per cent. We mistake the temper of our people if they stand it.—*Ohio Valley News.*

THE LARGEST CASTINGS.—The Pittsburgh Steel Casting Co. has signed a contract to furnish among other castings a stern post which will weigh 17 tons. This, it is claimed, will be the largest steel casting ever made. Iron castings, however, have been made, so it is said, as high as 160 tons. At least it was stated five or six years ago that Park Bros. & Co. of Pittsburgh cast, in one piece, an anvil weighing 160 tons. The steam hammer for which it was made had a falling weight, exclusive of steam pressure, of 17 tons, with a clear stroke of nine feet. It is quite possible that the above remain, respectively, the "largest ever made in this country."

BURNISHING STEEL BY ELECTRICITY.—The following method of burnishing iron and steel by means of the electric current was recently communicated to the International Electric Society of Paris by M. A. de Meritens. The metal to be covered is placed in a bath of water at about 170° Fahr., and is connected to a source of electricity just strong enough to decompose the water. Under these conditions the plate becomes coated with a layer of magnetic oxide, which is firmly adherent and which will take a high polish. If too strong a current is employed the layer of oxide will not adhere to the metal.

A NEW WOODEN PULLEY has been devised on an entirely new principle. The center is of cast iron, and the rim is of wood, and it is made in two parts. It is claimed that by its use, better belt friction is obtained, and a saving in power is realized, as the spokes are so formed as to offer little resistance to the motion. By a novel and effective paper bushing, keys and set screws are entirely done away with, and the grip upon the shafting is perfect.

WIRE SHOE SOLES.—It is stated that in the various military districts of North and South Germany, as well as in Holland, trials have been made of wire soles covered with a substance resembling india rubber. These soles are said to be more durable than those made of leather, and to cost only about half the price of leather.

LOCOMOTIVE SHOPS.—There are 15 private locomotive-building establishments in the United States, which built 1912 engines last year, while the railroad-shops turned out 318. It was the largest production on record, the cost of the locomotives being near \$20,000 each.

A NOVEL FLAT-IRON.—It is said that a genius has invented a flat-iron and so utilized the principle of expansion of metals by heat that a little bell rings when the iron is hot enough to iron clothes with.

SCIENTIFIC PROGRESS.

Underground Waters.

Professor Daubree shows, in an interesting paper on the above subject in the *Popular Science Monthly*, that underground waters are potent agents in the formation of minerals. The following extract will be found instructive:

The mode of formation, or, as Buffon said, the genesis of minerals, is one of the interesting questions of their history. But the problem could not be approached until geologists had furnished precise data on the conditions of their bearing. Satisfactory solutions have recently been obtained in the case of a certain number of mineral species. Synthetic experiment, placing itself in the circumstances that seem to have presided at their formation, has succeeded in reproducing them, with their crystalline forms and all their essential characteristics, and has thus completed the demonstration of their origin. By means of this method of demonstration we have been able to ascertain that many minerals are due to the action of subterranean waters. From the most ancient epochs these waters have circulated through the crust of the earth, where they have left, at a multitude of points, signs revealing the part they have played and the course they have taken even more clearly than contemporary phenomena have done.

The sedimentary beds, formed like the deposits which the sea spreads every day in the bottom of its basin, are often distinguishable from one another, even at first sight, by certain exterior characters. The differences are, for the most part, produced by the action of subterranean waters, as is demonstrated by the animal and vegetable fossils, which were for a long time designated as petrifications, or, rather, by the chemical changes which these fossilized bodies have evidently undergone.

Here shells and corals, showing forms perfectly preserved down to their slightest details, are no longer composed of carbonate of lime, as they certainly were during the life of the animal to which they belonged, but are essentially different substances, quartz having entirely taken the place of the calcium carbonate. There are also other minerals, such as pyrites and sulphate of baryta, which have penetrated and crystallized within the cavities which the bodies of these invertebrates occupied.

AN IMMENSE METEORITE.—We learn from *Science* that the famous Bahia or South American meteorite, described by Morney and Wollaston in the *Philosophical Transactions* for 1816, and by Spix and Mertius in their "Travels in Brazil," was landed in Rio de Janeiro on June 15th, and is now in the collection of the Brazilian National Museum. The transportation of this great mass of iron, whose weight was variously estimated from six to nine tons, and which has been found to weigh 5361 kilograms, was rendered possible by the recent completion of a line of railroad passing within 115 kilometres of the Bendego creek, where it has lain since the unsuccessful attempt to remove it to Bahia in 1785. Credit for the removal of the meteorite is due chiefly to Chevalier Jose Carlos de Carvalho, who gratuitously took charge of the technical part of the operation, and to Baron Guahy, who paid all the expenses. The Brazilian Government also cordially associated itself with the undertaking. After about three months spent in preparing material and in studying the route to be traversed, the march began on November 25, 1887, and the meteorite was placed on the railroad on May 14th of the present year. A road had to be opened for this special purpose, as those existing in the region are only mule paths; and over 100 streams, one with a width of 80 metres, had to be crossed by temporary bridges. The route lay over several chains of hills and one mountain range, in which an ascent of 265 metres had to be overcome with a grade of 32 per cent.

ELECTROLYTIC PRODUCTION OF MAGNESIUM.—M. de Mongelas has lately devised a process for obtaining magnesium by electrolysis. An alloy of magnesium is first obtained in the form of an electrolytic deposit. The bath consists of a concentrated solution of chloride of magnesium, combined with an equally concentrated solution of the chloride of any other metal except aluminum. The solution preferred is one part of chloride of zinc and two parts of chloride of magnesium. The two solutions mark 18 degrees on the Beaume scale. Good results are obtained by using the electrolytic bath as the battery. The external jar contains the double chloride solution and the copper cathode; the amalgamated zinc anode is placed in dilute sulphuric acid. The zinc is deposited in a "spicular" or "arborescent" form, and the magnesium in granular crystals. This alloy is then washed, dried and crushed and finally melted in a crucible containing chloride of sodium. The zinc volatilizes, and leaves pure magnesium.

THE SEA BOTTOM BETWEEN SAN DIEGO AND HONOLULU.—Soundings made between San Diego, Cal., and Honolulu, S. I., show this part of the Pacific to be a basin with precipitous sides and a comparatively level bottom. In the first 100 miles west from San Diego there appear to be two valleys and two peaks. The first valley is from 622 to 784 fathoms deep, the first peak 445 fathoms, the second valley 955

fathoms, and the second peak 566 fathoms. Thence a precipitous fall takes place, giving in latitude 31 degrees 43 minutes north, longitude 119 degrees 28 minutes west (Greenwich), 115 miles from San Diego, a depth of 1915 fathoms. After that there is a gentle slope, with comparatively unimportant interruptions, at the rate of three feet to the mile, to the point of greatest depth, 3054 fathoms, at a distance of 400 miles east of Honolulu. The sharpest elevation is a rise about midway between the United States and the Sandwich islands, in latitude 26 degrees 30 minutes north, longitude 127 degrees 37 minutes west, the highest portion of which is 2159 fathoms below the surface. The valley to the west of this elevation is 2650 fathoms. The fall of the side of the basin east of Honolulu is even more remarkable than the descent off the American coast. Fifty miles from Honolulu soundings gave 498 fathoms; 40 miles farther east, in latitude 21 degrees 43 seconds north, longitude 156 degrees 21 seconds west, the depth was 3023 fathoms. Between the last-mentioned point and that of greatest depth a hill rises, on whose summit there are only 2488 fathoms of water.

SNOW FROM A CLEAR SKY.—On January 3d snow fell in Christiania from a perfectly clear sky. After a strong southerly wind, with cloudy weather in the morning, the weather cleared, but at about noon it again thickened, and snow and sleet fell. In the afternoon the sky again became clear, and continued thus, with a storm blowing from the west. Just before eight P. M., however, thick clouds again gathered, the full moon became obscured, and snow began to fall heavily. A quarter of an hour later the wind swept the clouds away, and the sky became completely clear, with the exception of a few clouds in the east. The stars shone brightly, and the full moon illuminated the landscape; still snow continued to fall thickly for some ten minutes. That the snow could not have originated with the clouds in the east is proved by the circumstance that the wind was westerly. A well-known meteorologist ascribes the phenomenon to the presence, at a certain elevation in the atmosphere, of a very cold layer of air, in which the ascending comparatively warmer air becomes condensed; the moisture being thrown out in the form of snow, but not in sufficient quantities to obscure the blue sky, the stars, and the moon. The great chilling of the layer of air referred to may have been caused by the coldness of the heavy snow-clouds which a few minutes previously filled the atmosphere.

HYDROGEN GAS.—A new source of hydrogen gas for experimental purposes has been pointed out. It consists of powdered slacked lime and iron filings. When these two substances are intimately mixed and heated to redness in a proper chamber, a very considerable amount of hydrogen is evolved. The only precaution necessary is, to use a vessel so shaped that the water of condensation will not fall or flow back upon the material. For experimental purposes a strong, soft glass tube, with a bulb blown at one end, answers very well. The open end must be directed downward in such a manner that the condensation water will be carried off, as noted above. From 20 grammes of an equal mixture of lime and iron filings, Stolba obtained, in the course of 20 or 30 minutes, 1230 cubic centimeters of hydrogen.

WALKING VS. ARM EXERCISE.—Walking on an even surface, says Walter B. Platt, M. D., in *Popular Science Monthly*, the only variety of physical exercise which most business and professional men get in town, is well known to be a poor substitute for arm exertion. The reason is partially plain, since walking is almost automatic and involuntary. The walking mechanism is set in motion as we would turn an hour-glass, and requires little attention, much less volition and separate discharges of force from the brain surface with each muscular contraction, as is the case with the great majority of arm movements. The arm-user is a higher animal than the leg-user. A man's lower limbs merely carry his higher centers to his food or work. The latter must be executed with his arms and hands.

BUMPING DURING DISTILLATION.—It is said by A. Reissmann that all bumping of liquids undergoing distillation is effectually prevented by placing in them one or more platinum spirals closely wound around several pieces of pumice-stone. The platinum should be heavy enough to sink the pumice. This is unquestionably true; but it is nothing new. One of the first "wrinkles" the tyro in the laboratory picks up is the knowledge that the introduction of a few angular fragments of stone placed in a boiling liquid will prevent bumping during ebullition, a fact which he at once proceeds to utilize when he improvises a water bath from a beaker glass and in other ways.

ESSENCE OF BIRCH.—French chemists now obtain from the essence of birch bark, by rectification, an essential oil which possesses among other properties that of being fatal to insect life, and an electrically insulating tarry substance; and these two products are so treated and combined with other substances as to produce an anti-oxidizing compound and an insulating material capable of the same applications as ebonite.

USEFUL INFORMATION.

AN EGG SHELL.—The shell of all eggs is studded with small orifices, which are the means of absorption and exhalation by which the little animal in the egg respire. On this knowledge are grounded all the methods of preserving this egg by closing the pores. These pores are more or less visible, according to the species of egg. They are very apparent in the egg of the ostrich, and scarcely visible to the eye in other species, but their functions are no less active. Many eggs are laid naked, dry and smooth; others are impregnated with a greasy, glutinous substance. The latter are chiefly those of sea-birds, or those which live in moist localities. This glutinous coating is doubtless intended to preserve the egg from the water, or to maintain the degrees of heat necessary to preserve life. Sometimes there are soft eggs laid entirely without shells, or without the albuminous inner membrane. This occurs chiefly in hens that are too fat, or have been overstimulated, or have not been able to obtain calcareous substances with their food. Egg shell is much used in medical preparations. When calcined at a low red heat it affords a very pure form of carbonate of lime.

THE MUSIC OF THE ANCIENTS.—The Egyptian flute was only a cow's horn with three or four holes in it, and their harp or lyre had only three strings; the Grecian lyre had only seven strings, and was very small, being held in one hand; the Jewish trumpets that made the walls of Jericho fall down were only rams' horns; their flute was the same as the Egyptian; they had no other instrumental music but by percussion, of which the greatest boast made was the psaltery, a small triangular harp or lyre with wire strings, and struck with an iron needle or stick; their satchet was something like a bagpipe; the timbrel was a tambourine, and the dulcimer was a horizontal harp, with wire strings, and struck with a stick like the psaltery. They had no written music; had scarcely a vowel in their language; and yet, according to Josephus, had 200,000 musicians playing at the dedication of the temple of Solomon. Mozart would have died in such a concert in the greatest agony.

TO RAISE OPIUM.—The San Bernardino *Index* says that a Chinaman named Ah Gee, who, except during the ten years that he has lived in this State, has spent most of his time in the poppy districts of China, is endeavoring to procure a farm upon which to raise poppies. He says that nowhere—not even in China—are there to be found such adaptations for the culture of the poppy as in San Bernardino county. He explains the manner of its culture as follows: The seed is sown in beds and the young plants are transplanted into rows. The plant grows to be large enough to produce some gum the second year, but is at its best when from three to ten years old. Two Chinamen will take care of ten acres if they understand the business. The seed is sold by all the Chinese stores in San Francisco and costs about \$1 per acre.

UTILIZING THE WASTE OF SAWMILLS FOR PAPER PULP.—It is found practicable at last to make the waste of pine sawmills available for paper pulp. In reducing the wood to pulp, hisulphate of lime has been used, this powerful chemical acting on the fiber only when heated; heretofore only lead-lined boilers would resist its action; these, however, being costly and hard to keep in repair. More recently there has been discovered in Germany a kind of brick lining for boilers, which serves the purpose in question. The wood, sawed in small pieces, is digested with hisulphate in large boilers lined with this brick, heat being supplied through lead steam pipes, nothing further being necessary except washing of the fiber. The hisulphate is made on the spot, by passing sulphurous vapor through porous limestone kept thoroughly wet.

JAPANESE CATS AND DOGS.—Some of the animals of Japan are quite different from the same species that are seen in America. The cats, for instance, have the shortest kinds of tails, or else none at all. Being deprived of this usual plaything, they are very solemn pussies. An American once took one of these tailless cats to San Francisco as a curiosity, and it utterly refused companionship with the long-tailed feline specimens there, but finding a cat whose tail had been cut off by accident, the two became friendly at once. Japanese dogs are almost destitute of noses, having the nostrils set directly in the head. The smaller the nose the more valuable the breed is considered.

PRESERVING FISH ALIVE.—It is proposed to preserve fish alive by placing them in vessels partly filled with water and hermetically sealed. It is said that fish so confined have been found alive after three weeks, without either air or water having been changed, while fish in an open jar died in 48 hours. If the air in the vessel is compressed the life of the fish is still further prolonged.

BREEDING RATTLESNAKES.—It is said that a Capt. Daniel Stover, his wife and William Dunn, agent at the Illinois Central railroad depot at Galton, Ill., utilize 40 acres as a farm for breeding rattlesnakes, which they sell to a Philadelphia drug firm for use in concocting a cure for

rheumatism. Capt. Stover's contract with them for the present year called for 250 snakes at \$2.25 each, none to be less than four feet in length or under six years of age. The snakes carry their certificates of birth in their rattles. Some which have had their poison sacs removed are kept about the house as mice exterminators, and are remarkably effective in keeping away the neighbors' children from the premises.

A GOOD RULE IN RIDING ON AN ELEVATOR.—It is a good rule, says an intelligent physician, always to ride up in an elevator, and when coming down to take the stairs. Like going uphill, walking upstairs is hard work, and sometimes risky, especially for people with weak lungs, defective respiratory organs or heart disease. But going downstairs hurts nobody, but is good exercise. Going down on a brisk run is a good thing; it shakes up the anatomy without incurring the danger of physical overexertion. This shaking up is good for one's internal mechanism, which it accelerates, especially the liver, the kidneys and the blood circulation.

A NEW PROCESS OF DRAWING ON WOOD.—A process has been perfected and patented for drawing upon wood by means of a fine metallic point kept red-hot, so that the lines are actually burned into the surface. A powerful oxyhydrogen or other flame keeps the point always at a high temperature, and yet the apparatus is so compact that it may be used with the ease and freedom of a pencil. It is, furthermore, so adjusted as to produce at will all shades of brown, from the lightest to that verging on black.

MORTAR THAT WILL STAND ALL SORTS OF WEATHER.—Mortar made in the following manner will stand in almost all sorts of weather: One bushel of unslaked lime, three bushels of sharp sand; mix one pound of alum with one pint of linseed oil, and thoroughly mix this with the mortar when making it, and use hot. The alum will counteract the action of the frost on the mortar.

KEEPING OFF FROST FROM COFFEE PLANTS.—When a frost is threatened in the coffee districts of Guatemala, the farmers build, in furnaces provided for the purpose, fires of tar, pitch, or other smoking substances, which keep away the frost.

TWO FREDERICS.—There was a Frederic III, Emperor of Germany, before Unser Fritz. He reigned from 1440 to 1493, and enjoyed the sobriquet of "the Pacific." He belonged to the Hapsburgs—the house now reigning in Austria.

LARGE SUNFLOWERS.—Some sunflower plants have been raised in the prison grounds at Carson, Nev., that stand 12 feet high and sport heads that measure 56 inches in diameter.

GOOD HEALTH.

Halth of the State.

According to the monthly report of the State Board of Health for August, reports were received from 51 cities and towns, with an estimated population of 722,600, in which the number of deaths was 908, which is a monthly percentage per thousand of 1.25, or an annual death-rate of 15 per thousand, which is the lowest percentage we have had during the year, and indicates an absence of any serious epidemic diseases.

Consumption caused 138 deaths, over one-sixth of the total mortality.

Pneumonia was fatal in 43 instances—32 of them in San Francisco, 4 in Oakland and 1 each in Stockton, Santa Rosa, Santa Clara, San Bernardino, Nevada City, Marysville and Dixon.

Bronchitis caused 14 deaths, 13 of which occurred in San Francisco and 1 in Trinity county.

Other fatal diseases were congestion of the lungs, whooping-cough, diphtheria, scarlet fever, typhoid, remittent and typho-malarial fever, cerebro-spinal fever, cancer, heart disease, erysipelas and alcoholism.

Although last month was very warm in the interior, cholera infantum was reduced from 60 to 30 deaths, and the number of cases of diarrhea was less.

Reports received from 75 localities continue to indicate a very limited amount of sickness throughout the State, and although during some days within the month the temperature ranged as high as 111° in some parts of the State, not a single case of sunstroke or thermic fever was reported to this office, or, as far as known, occurred within its borders.

Several cases of smallpox are noticed, but no deaths are reported. The report alludes to these cases as follows: "Owing to the exceeding mildness in the character of the disease which developed during the past winter, proper precautions were not taken in those parts of the State, outside the large cities, to properly destroy the clothing, disinfect or fumigate the premises, or render it improbable or impossible for the disease germs to exist in or about those attacked by the disease, many of the cases never going to bed, and others as equally careless of the health of their neighbors. As a result, we may look for an outbreak of the disease when the winter season approaches and these diseased garments are again brought into use. What was mild in its form last winter may be most virulent in its course this winter."

The wisest plan to pursue, then, is to get vaccinated early, and thus anticipate disease by timely preventive measures."

Every care should be taken to destroy all garments which by any possibility may be infected.

VACATION VICTIMS.—The London *Lancet* refers as follows to the folly which some people are guilty of in overdoing things during their summer vacations: "Every year the vacation season claims its quota of victims. Many who have become somewhat enfeebled by long confinement and close attention to the calls of sedentary occupations rush away for a short holiday and endeavor by systematic overexertion to make up for the inactivity of the past months. Every year brings its sad warnings of this folly in a record of fatalities, while the experience of most practitioners shows yet more clearly that this overstrain is followed by prolonged illness. The circulatory and respiratory systems work hand in hand and rebel against any sudden disturbance of their ordinary routine. The danger is always greatest when, in the presence of any cardiac weakness, the exertion demands an arrest of respiration. In moments of intense nervous excitement the breathing is frequently unconsciously stopped, and the strain upon an enfeebled heart then becomes very severe." In reference to the last few lines of the above, the *Lancet* instances a case of the death of a prominent gentleman, Sir John Rose, which resulted from sudden over-excitement, as follows: The gentleman had already fired twice at a stag in the hunting-grounds, and when aiming a third time suddenly expired. Emotional excitement necessarily produces palpitation, and the fixation of the thorax then adds to the difficulty at the moment when the heart is at its weakest.

EDISON AND THE YELLOW-FEVER GERM.—Mr. Edison, the inventor, thinks he has found a method of exterminating the yellow-fever germ. It is to sprinkle caustic soda and gasoline throughout the infected city. Said he recently: "Gasoline has the peculiar property, besides reducing the temperature and thus killing the microbes, of displacing the water in all organic matter, causing it to perish; but as gasoline is not easily absorbed by wet ground and would probably fall in a measure to do its work, I have discovered that caustic soda will answer the purpose in these instances. The microbes, being organic, must contain fatty acid, and caustic soda will saponify anything containing fatty acid; so in a wet place I would liberally sprinkle caustic soda, which could be done at a very small cost with the aid of a street-sprinkler. Hills and dry places could be protected with gasoline." Mr. Edison thinks that with \$5000 he could cover Decatur with gasoline and caustic soda an eighth of an inch in depth. The examination of yellow-fever germs will probably be a prominent study of medical students this fall, as some physicians in Jacksonville are preparing specimens to send to various medical colleges in the North. It will be fortunate if a remedy or preventive is discovered.

THE USE OF WATER ON THE SCALP.—"People become bald from washing the head," said an English barber. "The use of water on the scalp may make a man feel buoyant for a time, but you will notice that the hair becomes dry and brittle afterward. The water and subsequent rubbing with a towel, dry up the oil in the roots, and in time the hair becomes dead and drops out. In England people never think of washing the hair. A good comb and stiff brush are all that are needed to keep the head clean. The women often spend hours in combing out their hair, and that is the most laborious part of a maid's work. Instead of shampooing, English barbers use a machine shaped like a little barrel and covered with stiff bristles. This is run by a small gas engine, and will winnow every speck of dirt out of a man's head in a few minutes. I have heard there are some in use in this city, but I have never seen one."

"HARDENING" CHILDREN.—There is a tolerably general impression in many quarters that in order to promote the health of children it is advisable to subject them to a "hardening" process. The aim is to encourage native energy by opposition, to engender strength of mind and body by early participation in the struggle for existence. The principle is in itself a wholesome one, and is not without its parallel in the history of nature's processes. Care is most necessary, however, in its application. Without such care it may be, and frequently has been, overdone. In particular must it be remembered that all success in the adoption of this plan in education depends on the possession by a child thus trained of a basis of sturdy physical vigor. A delicate child, if similarly treated, would languish and succumb.

HOW THEY DISINFECT FLORIDA MAILS.—In order to fumigate the mails which leave Jacksonville, Fla., they are emptied loose into a large box, which has a wire bottom, and kerosene and other disinfectants are burned under the box from 8 to 12 hours. All the smoke from the burning matter has to pass through the mails.

SPEED OF METEORS.—While the most rapid cannon shots scarcely attain a velocity of 600 yards a second, meteorites are known to penetrate the air with a velocity more than 80 times as fast—from 40,000 to even 60,000 yards per second, a velocity which raises the air at once to a temperature of 4000 to 6000 Centigrade.

The Kootenai District.

A Mining Camp in British Columbia.

A gentleman who has just returned from the West Kootenai mining district, in British Columbia, furnished the *Butte Miner* some particulars of this camp. The district lies about 50 miles north of the Idaho border, on both shores of Kootenai lake, which lies about north and south. The lake is 100 miles long and 15 wide at the widest near the center. The Kootenai river, which rises in Montana, flows through Idaho and northwesterly across the border to the southern end of the lake. The outlet of the lake is about the center and flows westwardly into a fork of the Columbia from the west side of the lake. The West Kootenai mining district lies north and south of the outlet, and on the opposite or eastern side of the lake. Salishury is the town that furnishes this district with its supplies. It is on the south bank of the outlet, a few miles west of the lake. The district is reached from the American side by the Northern Pacific. Leaving Kootenai Station, a couple of miles east of Sand Point, a wagon-road runs to Bonner's Ferry, 80 miles north on Kootenai river in Idaho, which runs northeast into Kootenai lake, and is navigable for boats of considerable draft. A steamer plies between there and Salishury. The trip can be made from Butte in three days and a half.

On the east side of the lake, north of Crawford's bay, which is directly opposite the outlet, the ore is silver in a galena formation, and the Blue Bell is the principal mine here. On the west shore the formation is galena and carbonates of both high and low grade. The silver ore is most plentiful through the district. High-grade ore from the Silver King and Kootenai Bonanza have been shipped from there to Anaconda with good results, and yesterday a shipment of 20 tons arrived in Butte to be reduced here. A shipment of galena ore was made last spring to Omaha with returns of \$220 silver and 17 per cent copper to the ton. But gold and copper have been discovered, the latter this spring, of a very high grade. The copper and gold lie between Cottonwood creek, that flows to the outlet of the lake near Salishury, and old Forty-Nine creek, further west, also an affluent of the outlet, where very good placer mining existed years ago. The gold is free-milling quartz, and has assayed from \$8 to \$1400 a ton. The gold ledge are very extensive. The Golden King has a ledge 150 feet wide and of unknown depth. It is traced the full length of the claim. The ore is free-milling and assays an average of \$43 a ton.

The location laws are pronounced simpler than those in this Territory. Quartz claims are the same size as here, 1500 by 600 feet. Twenty-five days' work a year have to be done to represent a claim, or a hundred dollars' worth of work at \$4 a day. Heavy fines are the penalty of making affidavit that work has been done without doing it. It is a punishable offense, after stakes are once fixed and the claim recorded, for any one to move the stakes without permission of the Gold Commissioner. The latter is an all-powerful autocrat, more on the Spanish than the English pattern, whose will is law and who can sentence an offender off-hand without judge or jury.

The winters are not very long there. This year the ice was off the river by the 20th of March. The country is heavily timbered, and, as may easily be supposed, there is plenty of water.

HAYSEED MINERS.—There are many kinds of miners found in our different camps. There is the genuine old-timer, who began his career in '49. From him the scale is graduated down to the green tenderfoot just arrived from the States, but worst of all is the hayseed miner; he who leaves his ranch and starts out on a stampede, expecting to strike it immensely big and return the possessor of untold wealth, so he can awe his less venturesome neighbors by his aggregated wealth. When a number of these people get into a new placer camp they generally pass their own district laws and stake out claims as near the size of the ranches they left behind them as the United States mining laws will permit; then the trouble begins, as they can generally outvote the experienced miners near them. In the quartz camps they are a drawback also; they get a prospect that shows some indication of mineral wealth. Because a well-developed mine sells for a high figure, they imagine that theirs is just as valuable. They will not dispose of it or hand it for any reasonable figure, the representatives of capital they look upon as little less than thieves, they hang on to their claims, and very seldom make them productive; their actions drive capital out of the camp, and quite often the hayseed miner packs his blankets back to his ranch to find that it has sorely needed his attention. He abandons his prospect, applies himself to his farm when the experienced miner relocates his claim, develops it and sells for a good figure; then the hayseed curses mining and pronounces it a delusion and a snare.—*Spokane Falls Herald*.

GRAFTING WHITE SKIN UPON BLACK.—There is a negro in a New York hospital who has a patch of light-colored skin on his back. It was grafted there, he having lost the original cuticle by falling against a roller in a shoe factory. The pieces were taken from the arms of a young medical student. At first the transplanted skin remained white, but it is said to be slowly turning black.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, Sept. 29: At the Wildman mine the station at the 600-foot level is about completed, and drifting in earnest will be inaugurated shortly, and all expect to hear of some good discoveries in the near future. Timbers, spiling and other winter supplies are coming in daily. At the Iowa work has become active again on account of getting a supply of water sufficient to run the mill, and it is hoped to be able to run the mill steadily. In drifting east at the North Star a ledge of good dimensions has been encountered at a distance of 100 feet from the shaft. The ledge is about five feet thick and somewhat split up. The general opinion is that as soon as it becomes solid and well defined the rock will pay.

Calaveras.

THE UTICA MINE.—Mountain Echo, Sept. 26: Preparations are making for the erection of the new hoisting works on the south shaft of the Utica mine. The derrick to be used for raising the large timbers into place was put in position during the week. The works to be erected on the south shaft will be of the same dimensions as those on the north shaft. Messrs. Rider and Lee are now at work framing timbers for the new 40-stamp mill to be built in addition to the 20 now in use. A scene of general activity prevails at the Utica day and night.

Mariposa.

RED CLOUD.—Mariposa News, Sept. 22: After about one week spent in repairing 10 stamps of the Red Cloud mill, it started. They have a large quantity of good ore in the mill and the returns are hoped to be very satisfactory. They have started two drifts, one east and one west from the bottom of the shaft in the Red Cloud.

A GOOD MINE.—Gazette, Sept. 29: Our informant visited the Storey mine about seven miles east of Coulterville one day last week. It belongs to Wm. Warner and Ed Weaver, and was located in 1885. They have a shaft sunk about 70 feet which shows a vein with good walls, and at the bottom of the shaft the vein is 2½ feet thick and carries free gold. With the assistance of capital this good quartz vein would no doubt develop into a valuable mine. There are many valuable quartz veins which are located and being held by the locators in the county, which capital could command, no doubt, if sought after.

RED CLOUD.—Mariposa News, Sept. 29: The Red Cloud company are repairing the remaining 12 stamps of their mill and will be ready to run their full 22 stamps as soon as there is water to do so. On Tuesday of this week Arthur Shimer bailed the first load of lumber to be used in constructing hoisting machinery at the Bondurant mine. It will take about 40,000 feet.

WHITLOCK'S.—Messrs. Moore & Helm have seven tons of good-looking rock out. They started their mill Wednesday for a short run. Helm Bros. have about 25 tons of ore out of the Triumph. They were recently offered \$1000 for it but refused. Good ore that.

BEAR VALLEY.—The sinking of the shaft on the Winner has ceased for the present; too much water. Indications good. About 60 feet of the Pine Tree ledge has been uncovered, and it is rich.

Nevada.

A BONANZA.—Herald, Sept. 25: From information received from the California mine, near Graniteville, it appears that a perfect bonanza has been unearthed. Reports state that in the lower tunnel the ledge has been found to be simply immense in size and very rich in gold. Rumors place the width of the ledge all the way from 17 to 30 feet, and a run of 16 days yielded \$19,000. The owners, Mr. Patrick Foley and M. Bohannon, have reason to be very jubilant over the prospect.

MORE STAMPS.—Tidings, Sept. 29: In view of the fact that the North Star company has more quartz coming out of the mine than the 30-stamp mill can reduce, ten stamps are to be added. The addition will not be expensive, nor will it require a lengthy period to complete, for when the mill was built provision for two extra batteries (ten stamps) was made.

A NEW FIND.—Herald, Sept. 29: The Kistle Brothers have for the past two years been prospecting a ledge located near the Charonnat mine, about a mile and a half from this city. They have been engaged in running a tunnel during all the time, to strike the ledge, and day before yesterday reached it. The ledge is at present small, being about six inches wide where tapped, and its richness is not yet fully known, but the owners think they have made a good find. It is in a good district and has every convenience for cheap working.

COLUMBIA HILL.—Quartz is booming on the Ridge and now is a good time to invest. The Seneca company have a two-foot ledge which is said to be rich in free gold; Cherokee has consequently received quite a boom. Geo. Baker and J. A. Jones have been working on the Golconda for the last couple of weeks. At a depth of 20 feet they have struck a 5-foot ledge which prospects exceedingly well. They are well pleased with their prospect and feel greatly encouraged. The El Dorado company are still driving their tunnel ahead, but as they have very hard rock it is slow work. J. A. Craig is prospecting for gravel near the Eureka Lake company sawmill. He has an incline down about 30 feet and expects to strike the gravel within the next five or six feet. Mr. Craig deserves to strike it rich, as he has done a great deal of prospecting in the last couple of years.

NEVADA CITY MINES.—Transcript, Sept. 29: At the Providence, 20 stamps are pounding away on a good quality of quartz from the lower workings, where there is said to be one of the best ore bodies ever developed in that mine. On Monday the company will put at work a score or so of miners who have already been engaged, and it is hoped that before next spring this extensive and valuable property, which has admittedly been one of the most potent factors in the city's prosperity of late years, will be working as large a force of men and turning out as much gold as it did previous to the labor troubles of

last year which led to its operations being circumscribed. The Nevada City mine, which had been employing in the neighborhood of 50 men when last February it was compelled to shut down on account of a lack of working capital and bad management combined, is in a fair way to be started up again within the next 30 days. B. N. Shoecraft, the company's secretary, has for several months been negotiating with the directors and stockholders for a lease of the mine; Eastern parties having positively assured him that in case he could obtain it they would advance the funds necessary to pump out the water and resume the extraction of ore, it being part of the agreement that the company shall apply the proceeds of the lease to the payment of the claims against them. Mr. Shoecraft learns that the company favor the plan, and their written consent to the agreement is daily expected. When it arrives the negotiations with the Eastern parties will be completed without delay. It is the intention of the lessees to put the hoisting, pumping and milling machinery in thorough repair. The mine has been well opened to the 800-foot level, where there is a 350-foot chute of pay ore that shows considerable improvement over that found in the level above. A station has been cut at the 1000 level, and the program is to start new drifts at this point, as well as to continue working the ledge above there. At the Spanish, just north of the Nevada City, a small force of men is at work. They have a good chute of ore and there is on the dump a crushing of ore that has every appearance of paying well. The Mountaineer is running regularly with encouraging results. The Champion Co. is steadily forging ahead in the matter of opening new ground. They are sure to eventually reap rich reward for their pluck and enterprise. The representative of the Chicago and Loudon syndicate who a few days ago hounded the Merrifield and Charonnat mines says that some of his principals will arrive here shortly to make a critical examination of the properties. If they are favorably impressed, as he seems certain they will be, these two old-time producers will soon again be in full blast. The bonds have four months to run. The reorganized Murchie Co., doing business under the name of the Lone Star Co., are busily engaged in perfecting their plans for putting the property on its feet again. Several valuable ledges are included in the boundaries of the claim, and past work on them has demonstrated that they are of good size and quality. The other claims in this district on which work is being done are looking well, and a number of prospects that give bright promises are being quietly developed. Taken all in all, the outlook for Nevada City's quartz-mining interests is far from gloomy.

MORE STAMPS.—Tidings, Sept. 22: Sixty-five men are now employed at the Omaha & Lone Jack Consolidated on day's pay, and all the underground work in progress is confined to the Omaha shaft. This is 700 feet in depth, while the shaft in the Lone Jack ground pinches 600 feet. Both are clear of water and have been placed in good repair. A drift to connect the two at the 400-foot level of the Lone Jack is being pushed from both shafts, and a fortnight will see the job accomplished. The ore is paying for all development and deadwork done, and of the latter there has been a great deal. Workmen are now engaged in adding eight stamps to the ten-stamp mill, and in removing the old wooden overshot wheel heretofore employed in furnishing motive-power and replacing it with an eight-foot Pelton wheel. Within a week the new wheel will be in place, and within two weeks, or three weeks at the outside, 18 stamps will be running night and day on ore of good quality. The quartz extracted is coming from virgin ground and the outlook justifies the belief that Grass Valley will within a short period add another dividend-paying mine to its roll of honor.

Plumas.

STRIKE AT BUNKER HILL.—Plumas National, Sept. 22: Last Saturday the men at the Bunker Hill mine, near Pilot Peak, stopped work on account of the company passing an order or resolution on September 1st that any miner working for the company after that date should take scrip for pay until July next, and that what came out of the mine should go for dividends to the stockholders. The mine is situated at an altitude of about 6000 feet. Still the miners think that "wind pie" is rather thin for the next ten months. Three of the miners wished to work on the company's terms, but the discontented ones kept them out of the mine.

San Diego.

OWENS.—Julian Sentinel, Sept. 25: It is doubtful whether or not the Owens mine will start up for some time.

PACIFIC.—The Pacific Mining District is a fraud. **JULIAN.**—Sentinel, Sept. 29: Several of the small mines are looking splendid this week. Three or four of them have commenced hauling ore to the mills. The Gold King and the Gold Queen are extracting rich ore.

REDUCTION WORKS.—National City Herald, Sept. 27: The reduction works are forging right ahead, and are beginning to attract much attention throughout the country. Communications are being received by Superintendent Chick from all sections concerning ore shipments and when the works will be ready to make contracts. Large quantities of ore are being brought to the city from the mines for mill tests, which are being made daily. We are glad these works are going up, and wish they were twice the size they are, for there is more work in San Diego county than they can do.

Sierra.

RIVER MINING.—Mountain Messenger, Sept. 29: In the early days of California, river and bank mining was nearly all the mining that was done. For the past 10 or 15 years, however, this species of gold-hunting, with here and there a lonesome exception, has been in the hands of the Chinese. One of the few bank claims still in the hands of a white man is located on the South Fork, about half a mile above China Flat, and is owned and worked by George Woolford. George has been on the South Fork, as miner and prospector, for the past 20 years or more. The claim, of which he owns about 1000 feet, was once, and geologically speaking but yesterday, the bed of the present river. The cause of the abandonment of its old bed by the river is patent to any who care to observe. When the river had dug its bed nearly to its present level, an immense mass of earth and rocks slid into the canyon and filling and covering up the old bed, forced the river to make a

new bed. This particular bit of old channel has had many owners, but none of them had the luck to hit the right spot. Five years ago Mr. Woolford located the ground, but it was not until the spring of 1887 that he seriously undertook its development, and owing to a short season and the large amount of preliminary work necessary, not much prospecting was done. His power was also inadequate. Last spring he sunk a pit about 30 by 40 feet in size, using a 32-foot pump driven by overshot wheels. Some four weeks ago he got his pit bottomed, taking out over \$400. He then started a tunnel up stream, which is now in 20 feet in good pay all the way. In one place as much as \$84 to the pan was obtained. Last week he took out about \$500. Recently two ounces of gold was shown to Mr. Jaynes as the product of one pan of dirt from a streak of soft bedrock. George is now getting a car and other things necessary to putting on a force of men. The car will be drawn from the pit and water pumped by water-power. The old river-bed is far enough above the present river bottom to be entirely out of the way of high water, and there is nothing to prevent work being carried on the year round.

Siskiyou.

RIVER MINING.—Yreka Journal, Sept. 26: Nearly all the river mining companies at the Klamath are now sinking down new cuts from the surface, keeping the full force on one cut, instead of dividing them on different cuts as in former years. By working down on one bench it is believed more work in raising gravel can be accomplished, as the machinery can be regulated to work at a single place with less danger and difficulty than hoisting from different places.

QUARTZ.—Thomas & Morris, discoverers of a quartz ledge in the Beaver creek district, in the Siskiyou mountain foothills, have been taking out very rich quartz lately, with good indications of their find being a permanent ledge. John Saxild has found a very rich quartz ledge about quarter of a mile up the mountain from the Centennial claim at Klamath river, in which gold is plainly visible to the naked eye in every portion of the quartz that is taken out. A good ledge at that point could be conveniently worked by having a water-mill at the river and sliding the quartz down to it.

HUMBURG CREEK.—Yreka Journal, Sept. 26: An expert from Portland, Or., named Cooley, visited Humburg creek last week in the interest of Oregon capitalists, to look at the quartz mines in that section. He thinks it is a good country for mining, and by thorough prospecting rich and extensive ledges can undoubtedly be found there.

Tuolumne.

GOLD.—Union Democrat, Sept. 29: Several parties are striking gold on Bald Mountain at present and there is every evidence that this winter will see large results in pocket mining. We are told that Mr. Bowman has resumed work on the Quartz Mountain mine and that a large force of men is at work in the shaft and stopes. This mine is a low-grade proposition, but the efficient superintendent, Mr. Bowman, has made it yield a dividend to the stockholders ever since he has had the management of it.

BLACK OAK.—Having received an invitation from Messrs. W. G. and Proctor Scott of the Black Oak mine, we visited that mining enterprise last Sunday. Mr. W. G. Scott showed us all over the mill and attendant works, and we must state that the entire institution is a representative one in every respect. The mill has ten stamps, but they are run at such speed and have such drop that 19 tons per 24 hours are crushed. The ore is received at the top of the mill building, passed over grates or grizzlies, where the finer particles fall down through into a bin and thence into the ore-feeders. The larger pieces pass beyond the grizzlies and down into a rock-breaker, from whence a passage is effected to the ore-feeders. The sand coming from the batteries passes over two rows of silver-plated copper plates, which collect the residue of amalgam. From there the sand continues on and is fed directly to four Frue concentrators. Mr. Scott then thinking that particles of sulphurets which were infinitesimally fine were not caught by the concentrators, employed the Morris device, which consists of a number of tables placed side by side, each about 18 inches in width and provided with canvas floors whose interstices catch the sulphurets as they pass downward with the water. The entire mining plant is economic, systematic, intelligently and progressively arranged. The ore from the mine is now highly sulphureted. The shaft proper is now down considerably over 200 feet, has splendid walls and the lead is about three feet in width. The chutes are of good length and indicate a strong lode. About 40 men are employed altogether and the scene presents a lively appearance.

NEVADA.

Washoe District.

CROWN POINT.—Virginia Enterprise, Sept. 29: Have completed the drain in the 700 crosscut and advanced the drift 15 feet since last report. The face is still in quartz of about the same character and value as reported last week. There are about two inches of water running from the face. The Suto tunnel drift is out 795 feet. The total distance to be run is 950 feet, leaving 165 feet still separating the two drifts.

HALE & NORCROSS.—On the 500 level the main west drift from the shaft has been advanced 35 feet, making its total distance 430 feet. The south drift on this level has been extended 20 feet and connected with the south upraise from the 600 level. The north upraise above this level has reached the 500 level, and a north drift has been started therefrom to connect with the 500 level south drift from the Savage mine. The west drift from the new station, 800 level, has been extended 40 feet, making its total distance 120 feet.

SAVAGE.—On the 400 level the southeast drift has advanced 18 feet. The drift is in a heavy, swelling clay formation, which requires close timbering. On the 500 level the south drift has been advanced 35 feet. Are saving the material from the drift for pay ore. Have cleaned out and repaired the south drift on the 950 level and have resumed work in the face. Have men on repairs and easing timbers in the shaft and on the different levels of the mine.

CLOSED.—As the Consolidated Imperial, Challenge Consolidated and Confidence mines are closed down pending the repairs to the hoisting works at

the Yellow Jacket shaft, through which they are all worked, there is nothing new from them.

BELCHER.—Are still engaged in cutting out the station commenced last week. The Suto tunnel drift is out 785 feet, leaving 165 feet yet to run to connect with the joint drift from the Crown Point incline.

POTOSI.—The south drift on the 650 level has been advanced 23 feet; total, 423. The face is in quartz, giving low assays. The west drift is in 21 feet. The face is in porphyry.

SEGREGATED BELCHER.—The south raise advanced 18 feet since last report, making the total 170 feet. There is no change to report of the ground run through.

ALPHA AND EXCHEQUER.—The east crosscut on the 382 level of Exchequer is out 130 feet. The east drift in Alpha is out from the old shaft 134 feet.

BALTIMORE.—Are still operating on the 338 level. The machinery is working well and there is no trouble to handle all the water that comes in.

CHOLLAR.—The drift west from the 350 station has been extended 47 feet; total, 80. The face of the drift is in clay and porphyry.

JUSTICE.—The work at the new mill is progressing well. Are steadily hoisting ore from the different reserves in the mine.

BULLION.—Running east on the 500 and 'south on the 640. There is no change in the character of the ground to report.

ALTA.—The mill is running steadily on ore from the 825 and 1150 levels, which continue to look well.

SCORPION.—On the 300 level west crosscut, No. 1 has been extended 8 feet; total, 50 feet.

ANDES.—Are repairing the shaft.

Pioche District.

YUBA.—Pioche Record, Sept. 26: Work has gone on regularly in the Yuba mine since our last report. The winze on the eleventh level has been extended to a depth of 30 feet and the crosscut on the twelfth level has been run a distance of 55 feet from the shaft, bringing it to within about 25 feet of the middle ore vein. The crosscut on the 8:30 level has been extended into the north vein and drifts on the vein east and west have been run about 25 feet, showing a well-defined fissure in quartzite walls in the face of both drifts, filled with ore averaging over 100 oz. in silver and 40 per cent lead. The working force is gradually being increased in this mine, and while no boom has yet followed its developments, a steady growth is observable.

Osceola District.

DRY WASHING FOR GOLD.—Salt Lake Tribune, Sept. 26: Duff Brown from Osceola, Nevada, tells of the wonderful doings down there of a gold-washer newly invented by Los Angeles talent. The machine works by the dry process, the drier the gravel the better it works. It does not weigh over 150 pounds, costs \$125, and can put through 30 tons of dirt every 10 hours. One man can turn the wheel easily, and for a country where it is difficult and expensive to secure an abundance of water, this machine is said to be the very thing. The one at Osceola is panning out in a way that is astonishing the miners. The machine separates and collects the free gold irrespective of fineness or shape from gravel, sand, loam and other debris. It is operated by hand or other power, and is said not to check in the heat. The dirt, after being put into it, passes through a hopper over a set of rifles, the bottom of which is formed by a fine meshed brass wire screen. The turning of a crank operates a double pair of bellows beneath, which forces a constant and strong blast of air through the meshes, blowing the dust out, the heavy gold falling to the bottom. It can be divided without difficulty to facilitate packing on burros. The miners speak highly of the device.

Hawthorne District.

PROSPECTING.—Virginia Enterprise, Sept. 26: The mountain ranges in the vicinity of Hawthorne afford one of the best fields for prospecting miners now open in this part of the State. Though the majority of the veins are small, they are generally very rich. Very few prospectors who have gone to work in earnest and industriously searched the hills, have failed to find a reward for their labors. As the veins pay at or near the surface, it is a good camp for men of small means, and when a man once gets a start there he is almost sure to hang on; one find leads to another—his first rich pocket does not knock the bottom out of his mine.

ARIZONA.

BRADSHAW.—Cor. Prescott Courier, Sept. 25: The mining interests of Pine Grove district are in a flourishing condition. Work is the order of the day, which is being done with telling effect. The Crowned King Co. has been developing its mines for the last year and putting in machinery. They now have one of the best developed mines and most complete mills in the county. Much credit is due Mr. N. C. Shelds, under whose management this work has been so successfully accomplished. The Oro Bella Co. has opened up a very promising property, and are now making roads to bring in their machinery. All through the district there is every evidence of a big boom in mining interests. Wm. Brittenham has about completed a tunnel on his rich ore body; Jake Henkle's mines still keep up their reputation, and he is now taking out lots of high-grade ore; the Lison boys' mines are showing up better than ever; E. S. Junior is as usual taking out very rich ore; he has a bonanza; Sines & Elliott have a fine property and are rapidly opening it up; the Boaz Co. is pushing work on its property and expects to have its mill in running order in a few weeks. Dumps and storerooms of the Arizona Ore Sampling Co. are big with ore. Mr. McGowan, superintendent of the Senator mine, has his big shaft down 90 feet in good ore. Stamps are being set up in Mr. Kerr's mill at Antelope. Riggs & Lawler, owners of the Hillside mine, near the Santa Maria, have purchased a complete smelting plant and will shortly have it up and at work. Their ores, as well as a majority of ores in the district, can be smelted with ease. Dan O'Boyle has his force at work, developing new places in the Montgomery mine. H. M. Hughes has a 60-foot tunnel in the Ground Hog mine, Walker district.

RICH ORE.—Prescott Courier, Sept. 29: The Arizona Ore Co. of Prescott has shipped 402,000 pounds of rich ore, containing gold, silver and lead,

since September 1st. The company shipped to-day by train 70,000 pounds. Receipts of ore for the last three days, 87,542 pounds. Company has been paying from \$15,000 to \$25,000 per month. Shortly after Mr. Cockburn started the plant, a great many people said the mines would not afford sufficient high-grade ore to keep the plant busy, but they have and will continue to do so. Realizing the good the company has done the country, the *Courier* hopes it will, ere long, put in a plant that will be able to work low-grade ores, of which there are hundreds of thousands of tons in mining districts near Prescott. E. G. Wager, a well-known citizen of Tip Top, is in Prescott. His district produces very rich silver ores, and has for years been a great shipper of such ores. It is now very prosperous. The Smithlines are shipping ore that yields 1000 ounces of silver to the ton. Mr. Wager came through Bradshaw, Peck, Turkey creek, Hassayampa and Groom creek districts and found the miners nappy. At Bradshaw basin Mr. Shelles showed him the mill dumps. Oro Bella Co. people were in fine spirits. He saw about 50 men at Alexandria, Peck district. Cy. Curtis was exhibiting specimens from a point mine he had just located. Messrs. Van Name and Robeson are here from Big Bug district. Van Name's mill is doing good, safe work. Three big bars of silver bullion were brought here by Mr. Robeson. They are at the O. K. Robeson & Foster are assorting several carloads of Middleton mine ore for shipment by the Arizona Ore Co. Shull & Austin's teams have just brought to the works 25,000 pounds of rich gold sulphuret ore from the Congress mine. These sulphurets are worth over \$150 to the ton in gold. Superintendent Thompson will soon be running three smelters at Jerome. A steam hoist, smelter, etc., will shortly be erected on Lower Big Bug. Bigelow & Smith, Frank Kuhne, Dan Hatz and scores of other miners are taking out shipping ore. Fred Williams is expecting orders to place more men at work on the Storm Cloud.

CAMPS AROUND PRESCOTT.—*Journal-Miner*, Sept. 29: The Congress still continues to look well in all its shafts, winzes, drifts and tunnels. I. T. Stoddard has men engaged in building a road from Minnehaha to the Oro Bella company's mines. Eight carloads of ore have been sent out from the sampling works during the first two days of this week. John Lawler yesterday received \$1800 as net returns from a carload of ore shipped from the Hillside mine. Magnus Moe has deeded a half interest in the North and South Consolidated mining claim to J. E. Floyd, for \$500. T. Otto has sold one-fourth interest in the Perry mine to Charles Cappel for \$500. John Lawler et al. have sold to Nathan Levy et al. one-half interest in the Robert E. Lee, Lucky Cuss and Eagle mining claims, for \$5000. Chas. H. Akers brought in nearly \$200 worth of gold a few days ago from Cherry creek, the result of a short run made by Richard DeKuhn in his arastra. J. M. W. Moore of the Prescott sampling works reports the shipment of 18 carloads, nearly 200 tons, of ore since September 1st, and they have several carloads stored in their bins. An immense body of high-grade ore, said to be larger and richer than any ever encountered before in the property, was recently struck in the McCracken mine, Mohave county. It is a fact worthy of note that of some eight or ten stamp-mills in this county, which were lying idle a few months ago, there is not a single one now that is not either in active operation or in process of repairs looking to an early start. J. W. Wilson returned to-day from a visit to the Howard and Senator mines. Messrs. Harlan & Barrington, of the former, are only able to run their mill about two hours per day, owing to a scarcity of water. The outlook for the erection of reduction works in Prescott at an early day is splendid at present. Should the proposition recently submitted to the Colorado parties be rejected, there are others who are prepared to put in a plant, provided a donation of \$15,000 in ore is guaranteed them. Messrs. Fisher & Dunkle have their new steam hoist for the Scotch Lassie mine on the ground. Messrs. Smith & Hartin, who own the Oversight mine in Kirkland valley, received a sample of ore yesterday from their claim which assayed \$80 in silver and about 60 per cent in lead. John McDermid came in last evening from the lower end of Slaughterhouse gulch, where he has been engaged in building an arastra to be run by water-power, with which to work the ore from the Dolly Varden mine. J. W. McGowan, superintendent of the Senator mine, reports work progressing finely on that property. A very fine body of ore some two and a half feet in thickness was encountered in the new shaft at a depth of 90 feet. Mr. Shelles, of the Crowned King company, has 50 mules employed in packing ore from the company's mine to the mill.

COLORADO.

OURAY MINES.—*Denver Tribune Republican*, Sept. 22: A *Republican* representative met Mr. Lou N. White from Ouray, the other day, and in conversation gleaned a few interesting pointers on the present outlook in mining circles in that section. Mr. White is one of the fortunate owners of the Carbonate King mine in the Red mountain district, and is one of San Juan's best-posted men on mines and mining. He says the condition of the mining industry of Ouray county is first-class and 100 per cent better than that of any previous year. The advent of the Denver & Rio Grande railway into the county and town of Ouray from Montrose, and the building of the Mears railway from Silverton into the county and the Red mountain mining district, has infused new life and activity into the mining industry in that section. The tonnage output for this year will double that of any previous year. There has been considerable activity in mining sales in all the districts in the county, and the purchasers are largely St. Louis capitalists who have been singularly fortunate in their investments. Among the large number of properties which they have purchased can be mentioned the Saratoga, Vanderbilt and the Genesee, in the famous Red Mountain district; the Ruby Trust, United States Depository and the Humboldt, in the Mount Sneffels district; the Saxon (recently sold by Senator Tabor for \$50,000), the Amador and Lily, Bonanza, Maid of the Mist and the Forest, in Poudrekeepsie. These are only a few of the most prominent mines placed in St. Louis. Many other properties of less importance have been placed in various Eastern money centers, and many other sales are pending at the present time. In consequence of the great activity in mining circles, the

town of Ouray and the entire county have increased wonderfully in population and wealth during the past year. Among the regular heavy producers are the Yankee Girl, Vanderbilt, Genesee, Carbonate King, Maud S., Belle of the West, Saratoga, Virginus, Terrible, U. S. Depository, El Malid, Dexter, Old Out, Iowa Chief, National Belle and scores of smaller producers. A great deal of prospecting is being done among the hills, and encouraging discoveries are of daily occurrence.

IDAHO SPRINGS.—*Idaho Statesman*, Sept. 23: The Idaho custom-mill is being supplied with more ore than it can treat, and is pounding away day and night. The Rover Mining Co., consisting of Denver and Chicago parties, has resumed work on the Rover mine up Fall river. The Mary Foster and the Humboldt have been consolidated, and will be operated extensively by a strong company. During the month of August, the sampling works of Matthews & Co. shipped 1,613,068 pounds of ore, containing 15,112 ounces silver, 1414 ounces gold, 48,113 pounds lead and 5900 pounds copper. The Silver Age Mining Co. is pushing developments in both shaft and tunnel. The main shaft has now reached a depth of 300 feet, the last 63 feet of which have produced over \$3,000,000 net. Lesses on the Lake lodge, up Virginia canyon, are making a 100-ton shipment of ore to the Stevens concentrating mill at Lawson, for the purpose of ascertaining whether it will pay to mill the ore regularly, instead of shipping it direct to the smelters in its crude state as they have been in the habit of doing. Parker & Brushwood have a very complete little stamp-mill on Chicago creek just below the mine.

DAKOTA.

BINGHAM.—*Deadwood Pioneer*, Sept. 26: This claim, which created such a furor in mining circles several months ago, has been lying idle for some time, but is now the scene of considerable activity. Five men were put to work upon it Monday, and this force will shortly be increased very materially. The owners intend to develop the mine thoroughly, and have renewed operations in a manner which will undoubtedly fully compass their intentions.

TIN.—During the next three months the Harney Peak Tin Mining Co. will pay out for mere assessment work on its Pennington and Custer county mines not far from \$40,000. This money will be divided among many miners and prospectors in this portion of the hills. Who will say that such a company is not of great benefit to the country?

DAVEY SMELTER.—*Deadwood Pioneer*, Sept. 27: The old Davey smelter, now belonging to the Merchants' National bank, has been leased to Sheridan McBratney and others of Galena. While the public is not positively informed, the general impression is that the plant has been taken for the Queen company, and that when fires are started, it will be to smelt ore from the Queen mine. Owners in the Queen are positive that their mine can alone supply enough ore to keep the plant operating to full capacity. However, we are informed the purpose will be to do a custom business; purchase what ores other prospectors or corporations may have to sell, and thus aid and hasten development of many promising locations in the district. The enterprise is one that will commend itself to the majority of Galena mine-owners. There are half a dozen different properties in the district upon which a large amount of development has been accomplished, disclosing ore-bodies of greater or less proportion. The average value of ore is about \$30. The mines referred to can easily supply a plant double the capacity of the Davey smelter, without necessarily presenting for draft on locations on which only limited exploration has taken place.

IDAHO.

ORO FINO.—*Idaho Avalanche*, Sept. 25: The new Oro Fino mill is now running on ore from the Oro Fino mine, which is turning out well. The concentrator is saving nearly all the gold at little cost. If, as it is now supposed, a concentrator will save the precious metals, the solution of working ores in this camp has been solved.

ABOUT ORE TAXES.—*Bellevue Herald*, Sept. 27: J. V. Parker, freight agent of the U. P., at Salt Lake, is in Bellevue to-day to see about the rumored raise of \$1.60 on the ton for smelting charges on ores by Omaha companies. Mr. Parker does not understand why the Omaha smelters should make this increase when the railroad folks have just encouraged the country by a heavy reduction in freights. The poor and small mine-owners are the only ones to suffer by this increase, as yearly contracts are made by the larger mines here.

ROCKY BAR.—*Idaho Statesman*, Sept. 20: The water is very low in the streams of Western Alturas. We learn that Harry Thompson went over from Silver Mountain to Rocky Bar on Thursday last, and on Friday was hiring every carpenter he could find in the Rocky Bar country and vicinity to finish the Silver Mountain mill. J. M. Texton, the great mill builder, has been employed for the finish. Thompson tells wonderful tales of the richness of one of the company's mines. He says one lode will go \$60 to the ton and will average five feet wide. A large number of carpenters accompanied Mr. Thompson on his return Saturday morning. There has been considerable excitement in Rocky Bar over a mill test of ore made from the "Mountain Goat" lode during the past week. Forty-eight tons crushed at Jake Reeser's custom mill has turned out nearly \$100 per ton. The New York Co. has leased Mr. Reeser's mill, and after putting on about \$3000 worth of improvements propose to proceed further. This result has enlivened the camp very much, and has given a great impetus to prospecting.

SILVER DISTRICT.—*Statesman*, Sept. 26: A good many conflicting reports come from Graham, Silver district. The 20-stamp quartz-mill which has been in process of erection for a year is finished, or about as good as completed, and ready to run. A ditch has been constructed to run the mill by water, about two miles long, from North Fork of Boise. A tramway has also been constructed to run the ore to the mill, a mile distant. It is said that the mill and works are the best in the Territory. The only question about the success of this great enterprise is in the mine; while many report plenty of silver ore of a rich quality, worth \$50 and over to the ton, others report that they have very little ore and could not run the mill a week, and that it will take another year with all the hands that can be worked

to advantage to fully develop the mine or mines of the company sufficient to keep the mill running. This is a very important question, and everybody hopes the production of ore will be good and the mill will soon be started up and kept running.

DEADWOOD BASIN.—*Boise Statesman*, Sept. 29: Major Downs returned from Deadwood basin Thursday. He says he brought down 110 ounces of gold dust worth \$1550 per ounce. It took seven men 21 days to work the ground, and at \$3 per day and board, the cleanup left a very small margin to divide with the owners. They may find a better streak and still make money out of the investment. The major says that Al Karston has sold out his quartz claim in Deadwood for \$2300 cash.

DISCOVERY.—*Boise Statesman*, Sept. 29: There is some prospecting going on about ten miles from this city and two leads have been discovered near the summit east of the Idaho road, one owned by K. P. Mowman, and another by John Earley, that are very likely to make a boom for Boise City. One nine-four miles from here shows up better than Gold Hill or any of the other gold mines in Boise or Owyhee counties with the same development work.

MONTANA.

MONITOR TUNNEL.—*Butte Miner*, Sept. 25: The length of the Monitor tunnel so far as completed is 375 feet, and the face is in granite of a soft formation. The company a few days ago encountered in the ground of J. Crossman & Co. a ledge eight feet in thickness and of a very promising character. Samples taken from the ore body average 8 per cent in copper and 9 ounces in silver. The ground in which this strike was made is called the New Emerald and is the most promising of any of its kind struck in that vicinity for many a day, owing chiefly to its depth of 150 feet from the surface. Messrs. Crossman & Co. have the right to use the tunnel to convey their ore from their different ledges along the tunnel by allowing the tunnel company to run through their ground. The tunnel company will have to run 600 feet further before they come into their own ground. All hands were laid off at the Mountain Consolidated yesterday on account of the ore bins being completely full. The erection of the new gallowes frame has just commenced, also the laying of the new engine-bed. The new shafthouse, a large and commodious structure, has been completed. Stopping and drifting is being carried on extensively all over the mine. The Silver Bow mill is putting through 40 tons of ore from the Stevens and Belle of Butte, and also working considerable custom ore. The owners have placed in position what is called the Yates pulverizer, for the purpose of crushing ore. The Pacific is daily producing 40 tons of ore which is reduced at the Butte Reduction Works. It is said that over \$240,000 has been produced from the mine from the time the Parrot Co. threw up its bond on it for that amount. Mr. Brant of the Parrot mine has set in position and in full working order a peculiar but complete set of saws for the purpose of framing square sets at the Bluebird mine. This work has hitherto been done by hand, and the new process is a great saving to the three companies using it—the Bluebird, Mountain View and Parrot. The Wake-Up Jim and Green Mountain are to be connected by a crosscut that is at present being run for that purpose. The Parrot mine was idle yesterday, the chutes being full of ore both at the mine and smelter. Considerable prospecting is being done in the lowlands, but none on a large scale.

MADISON MINES.—*Cor. Inter-Mountain*, Sept. 27: Yesterday I visited one of the most promising gold prospects it has ever been my fortune to cast an eye on. This claim is called the Bill Fairweather lode and was located a week ago by James M. Bradley and Thomas Branham, and lies on the divide of the south fork of Mill creek and the south fork of Meadow creek. The ore body is at least three and one-half feet wide, and at a low estimate will mill \$100 per ton for that width, while I think that \$200 per ton would not be overestimating it. The ore is a telluride-appearing ore; nearly all of it shows large quantities of free gold in nuggets and wire of a high grade. Considering its size, I think it the richest and most valuable gold-quartz discovery ever made west of the Missouri. Should the ore hold out for 100 feet deep in size and richness, its value would be something enormous.

THE CURLEW.—*Mining Review*, Sept. 20: In the above-named mining property recent results obtained are proving its worth to a degree that cannot be otherwise than most encouraging to those who have at heart the mineral interests of Missoula county, wherein the mine is located, as well as being a source of pride and revenue to its owners, among whom may be mentioned the veteran mining man, A. M. Holter of Helena, as being most largely interested. It is learned that a site for the location of a smelter has been surveyed near the east end of the Curlew claim, the capacity of which will be not less than 50 tons per day. Several thousand tons of low-grade ore are now on the dump awaiting operations of the smelter before being converted into bullion. A great deal of high-grade ore finds regular shipment to the smelter at Wickes, with a result that assures the success of the mine. The new works will be in close proximity to the pretty little town of Victor, to which they will doubtless be a most valuable acquisition.

NEW MEXICO.

MILL.—*Lordsburg Liberal*, Sept. 29: Col. Morrow expects to have the Hercules mill pounding ore in a few days. He will begin with some of the ore on the Atwood dump. Jeff Whittington has bought his partner's—Adam's—interest in the Comstock group. Baxter & Whittington now own the entire group. O. R. Smyth has put a couple of teams to hauling concentrates from Carlisle to Duncan. He has not taken the contract to do all of the hauling, as has been stated, and the company teams will still be kept at work.

DEVELOPMENT WORK.—*Silver City Enterprise*, Sept. 29: The new hoist just completed by the Aztec company works like a charm. The Golden Giant at Pinos Altos is rapidly coming to the front. John T. Mitchell has superseded Captain Webb at Telegraph. Four or five additional miners will be put to work immediately. A new engine and skip have been ordered by the owners of the Golden Giant mine. T. N. Childers and Paul Curtis have leased the Unlimited Coinage mine near Bear mountain to

Atkinson Bros., who intend during the next six months, which time their lease runs, to do considerable work on it. The Golden Crown mine at Pinos Altos, owned by Joe Williams, Ed Baker and Andy Laid, is coming to the front. They have over 200 tons out ready for the mill. Frank Carter, president, and J. C. Howe, director of the Deep Down, departed for St. Louis Tuesday, after having spent several days at the mine, very much pleased with the outlook. On Saturday last 30 men were let out from the Mountain Key mine, the force being reduced from 60 to 30. The reduced force is sufficiently large enough to break all the ore that the Key mill can handle with its limited water supply at present.

WELL.—*Southwest Sentinel*, Sept. 26: The work on the well which is being sunk for water for the 10-stamp mill has been temporarily discontinued, owing to the large flow of water encountered at 14 feet. Negotiations are now on foot to secure the use of the Atchison, Topeka & Santa Fe R. R. Co.'s pump, with which to remove the water, so that the well can be sunk to bedrock. The railroad company telegraphed that it would lend the use of the pump; it will be set to work in a few days.

GROGETOWN.—The Scottish mine was sold last Tuesday by Special Master Harlee to George O. Smith for \$10,000. The sale has been confirmed by Judge Henderson.

BALD MOUNTAIN.—A strike has been made at Bald Mountain in the Silver King. At the bottom of the shaft, 120 feet, a large body of ore has been exposed running the whole width of the shaft; it will run in the neighborhood of 500 or more to the ton in gold and silver. At the depth of 62 feet a crosscut has been run a distance of 52 feet through ore. No side-wall has yet been reached.

OREGON.

THE MONUMENTAL.—*Bedrock Democrat*, Sept. 26: The *Democrat* reporter met Mr. J. B. Bowick, one of the representatives of the English syndicate who recently purchased the Monumental mining property in Granite district, and learns from that gentleman, who is just down from the mine, that work has been commenced in dead earnest, and already a force of about 30 laborers are employed there. The mine and mill have lain idle for the past ten years. In consequence of this the tunnels in many places have caved in by the rotting of the timbers and the mill is out of order in many ways. The company taking charge of the property have been compelled to start anew and retimber the mine and overhaul the mill.

BAKER COUNTY MINES.—*Cor. Bedrock Democrat*, Sept. 26: Things are quiet here at the Eureka and Excelsior. Everybody is waiting to see what will come next. Fruit creek rather has the "call" on us now. The Columbia presents a growing activity, warranted by the ore showings being made, and it would not surprise yours truly to see a formidable rival to Cracker City spring up in that gulch. Work on the Buckeye is going on slowly, but with good results, the owners having recently struck some \$300 ore in one of their cuts. The Buckeye is west of and on the parallel ledge to the Columbia. Little or nothing, save assessment work, is being done on the south extensions. On the North Pole the usual development work is going forward, with indications of continuous and vigorous work for the winter. The Ten Strike, above the North Pole and on the same vein, is under bond to the E. & E. Co., and is being worked with vigor. In the cove some development is going on in the Imperial, where a good showing is being made; likewise in the Gray Eagle, where a four-foot breast of high-grade ore has been shown up in the face of the tunnel. At the Monumental, recently sold to an English company, we understand Chinese miners only are being employed. The same is also said to be true of the Cabell Bros' mine. Quite a number of miners have gone over to those two mines during the past week, seeking employment, only to return with the same story—no white men need apply.

UTAH.

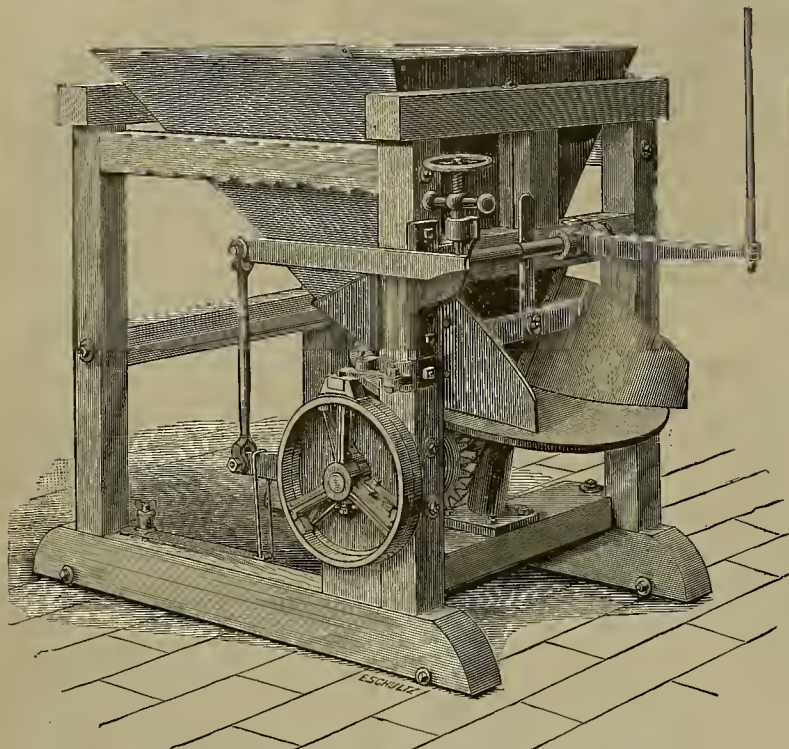
REVIEW.—*Salt Lake Tribune*, Sept. 29: The past week has been a quiet but active one in mining circles. The movements of ores and bullion have been heavy. The receipts of the metals in this city for the week ending September 26th, inclusive, were to the value in all of \$184,705.36, of which \$101,368.85 was bullion and \$83,337.51 was ore. For the previous week the receipts were of the value of \$149,394.12, of which \$82,004.96 was ore and \$67,389.16 was bullion. The Ontario output for the week was 58 bars of bullion, 32,948.03 fine ounces; ore sales, \$24,033.47, an approximate total of \$56,981.50. The Daly product for the week was 26 bars of bullion, 23,507.29 ounces; no ore sales. The Horn Silver miners apparently dormant. Fine bar receipts in this city for the week were to the value of \$40,966.81; base bullion, \$30,142.10. The product of the Hanauer smelter for the week was \$14,150 in bullion; of the Germania, \$16,008.94. Ore receipts in this city for the week were \$44,907.52 by Wells, Fargo & Co.; \$18,200 by McCormick & Co., including \$4950 Crescent and \$2000 Queen of the Hills; and \$20,230.99 by T. R. Jones & Co.

EUREKA, TINTIC DISTRICT.—The camp is prosperous. There is no difficulty existing between the "bosses" and the men. The wages are from \$2.50 to \$4 per day to the laborers and miners. All appear to be well satisfied. The population will number 1500 souls, and there is not, strictly speaking, an idle man in the camp. Particularly is this so of those who do not allow alcoholic influences to get away with their better judgment. In fact, this is a wonderful camp. The future of this section of the Territory is assured. Captain Day, who has so long had charge of a portion of the destinies of Eureka, has gone to California, and Hank Smith, the old Comstocker, has assumed complete control of the Beck and Bullion mine.

NEW EMMA.—*Salt Lake Tribune*, Sept. 30: The New Emma mine, Alta, will start its concentrator to work next Tuesday, after having been idle for quite a while. They have large quantities of concentrating ore in the old workings, and expect to keep the mill running until winter closes around them. Work will be resumed in the depth under the tunnel ere long. The ground there is looking well, and operations were suspended only because of the large quantity of water last spring. Friends of the mine speak very hopefully of its future.

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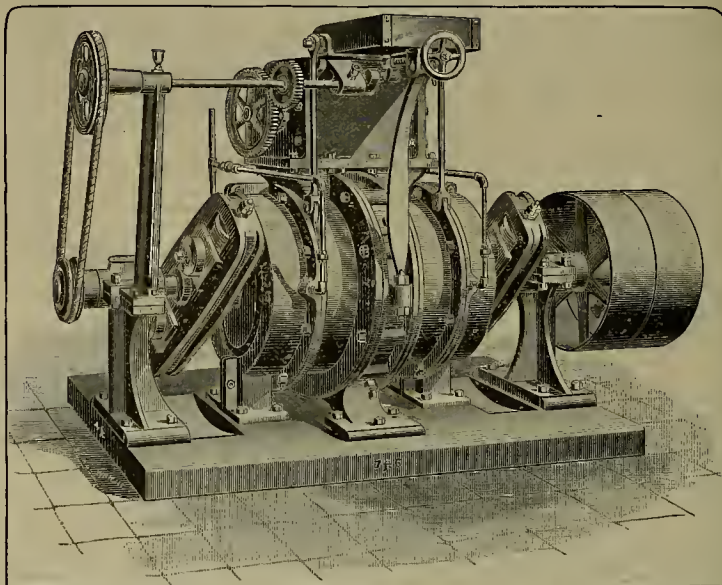
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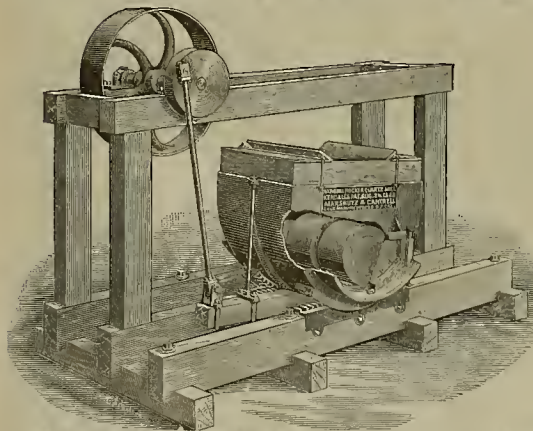
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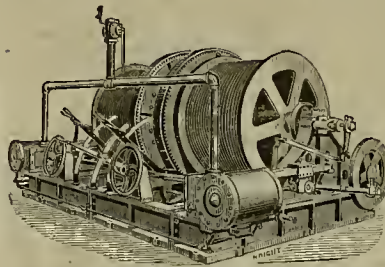
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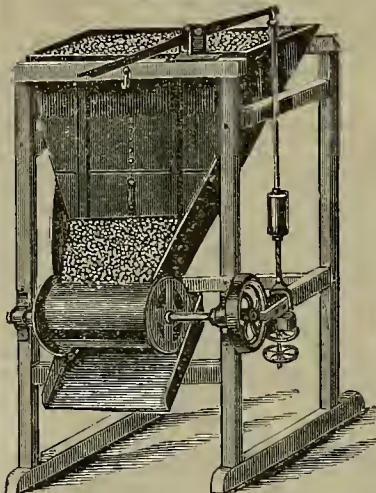
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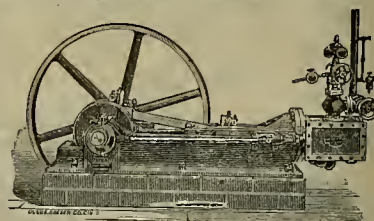
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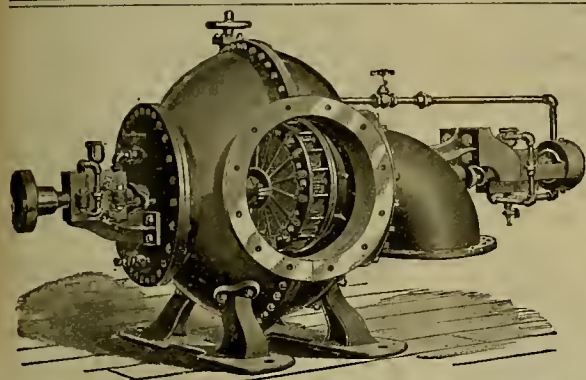
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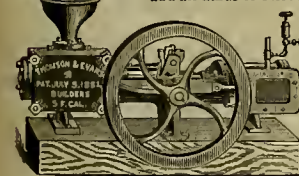
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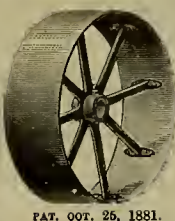
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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Oct. 4, 1888.
SILVER—The past week the London and New York markets have gained in strength, with steady advances reported. Various causes are assigned for the rise, the main one being that Russia has negotiated a small loan and the capitalists who have subscribed to it are buying silver to make the payments. Others, again, think it is due to the large purchases of wheat in both India and Russia and the demand for silver to remit in payment. As India's wheat exports will not aggregate as much as last year's, and Russia's only a little more, this theory is hardly acceptable. There are others again who claim that large capitalists directly interested in advancing and in keeping up the market value of silver have either formed or are forming a syndicate looking to the control of the leading silver markets. The out of silver last year is estimated as follows: United States, \$58,000,000; Australia, \$24,000,000; Mexico, \$26,000,000; Russia-Siberia, \$22,000,000; Central and South America, \$15,000,000. Total, \$145,000,000.

In our market holders appear to be unsettled in their views, although at the close they ask 94@94 1/4. The last reported sale was at 94c, bought for shipment to Calcutta. The shipments of silver bars for the month of September by sea from this port were as follows: Hong Kong, \$703,000; Bombay, \$16,700; Japan, \$157,000; Calcutta, \$60,000. For the first nine months of this year the shipments by sea from this port of silver bars aggregated \$7,617,900 against \$6,058,915 for the like time in 1887. Of the shipments so far in this year, Bombay took \$2,620,690 against \$504,790 in 1887; Calcutta, \$294,000 against \$65,250 in 1887; Hong Kong, \$6,046,373 against \$5,801,655 in 1887, and Japan, \$1,459,106 against \$2,218,975 in 1887.

LEAD—There is a good demand for pig, with prices well maintained at this season of the year; the consumption is quite large for the making of shot. By reference to the daily closings in the New York market it will be seen that prices have fluctuated considerably.

TIN—Pig tin in our market is reported dull but firmly held, owing to the high markets abroad. Buyers do not anticipate their wants, only buying in a hand-to-mouth way. Tin plate is also dull. To arrive, large consumers are slow in contracting, unless offered inducements.

BORAX—The market is reported to be in a strong position, owing to the active market at the East, with prices reported to be tending up.

ANTIMONY—The market is very strong at the last reported advance.

PIG IRON—The market continues to hold to strong prices, owing to receipts going into consumption as fast as received, and also to the higher and strong markets abroad.

QUICKSILVER—The market is reported steady at the decline. The home demand is reported to be increasing, but no great enlargement in the volume of quicksilver going out is looked for in this month.

COAL—The imports into this port last month aggregated 143,706 tons against 83,626 tons in the like month in 1887. From January 1st to September 30th this year, the imports aggregate 1,000,652 tons against 636,662 tons for the like time in 1887. The imports into San Diego and San Pedro are reported to have been correspondingly heavy. Although the imports are largely in excess of last year, yet importers are bulling the market up, owing to a strike in the principal Newcastle coal mines. They went on August 25th, and the only vessels which have since sailed from Newcastle for this port are the Celtic Chief and Patterdale on the 29th August, both of which had completed their cargoes before the strike. During the four weeks ending Sept. 5th, the coal departures from Australia to California embraced 10 vessels for San Francisco, 4 for San Diego and 1 for Wilmington, leaving 15 in port to follow, including 10 for San Francisco, 1 for Wilmington and 4 for San Diego. One of those for San Diego has since had her charter canceled. There are now supposed to be 25 vessels on the way from Australia to California and 45 entered out, as follows:

	En route.	Entered out.
For San Francisco.....	15	26
For Wilmington.....	3	7
For San Diego.....	7	12
Totals.....	25	45

Eastern Metal Market.

New York, Oct. 3, 1888.—The following are the closing prices the past week:
Silver.....\$87 60
Copper.....\$5 05
Tin.....\$23 75
Thursday.....\$87 60
Friday.....\$87 60
Saturday.....\$87 60
Monday.....\$87 60
Tuesday.....\$87 60
Wednesday.....\$87 60
The market closed as follows: Lake copper is nominal at \$17 1/2 in open market, but it is said that consumers are supplied at \$18 1/2. Pig lead is quoted at \$5 05 for this and next month, with more activity reported. Quicksilver is weaker; 63c is the extreme figure. No California is offering. Borax is very active. All other purchases made in the West will be wanted, and may possibly advance 1c on the late prices. Tin closed easier.

The following is the latest from the "New York Metal Exchange Market Report":

TIN—Sales of only 10 tons have been recorded, although there has been quite enough variation in values to attract scalping. The extreme range covers about 40 points, with closing figures for spot about the same as they opened, or a quarter cent higher than last Saturday; white future, which have been more irregular, make a net gain of 60@75 points. Closes firm and fairly active at \$23.80.

COPPER—Less complete apathy has prevailed than in previous weeks, but the market is still very dull, although quite firm and advancing nearly a quarter cent on the week, with total sales of 100,000 pounds. Closes at \$17.40.

LEAD—The aggregate sales reach 1800 tons, but 1350 tons of this was done on Monday; since when the market has been quiet, holding steady to firm throughout, with almost no change in price. Closes at \$4.97 1/2, against \$4.27 1/2 at same date in 1887.

SILVER—Remains flat, dull and unprofitable in the

way of commissions; but has gained 15 points during the week.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—@—; Biliton Tin, @—@—; Banca Tin, @—@—; Baltimore Copper, \$16.65@—; Orford Copper, \$16.00@25; P. S. C. Copper, @—@—; Foreign Lead, \$5.00@5.25; Foreign Spelter, \$5.40@5.60; Antimony, \$9.75@13.50.

The Philadelphia market is reported as follows by the New York Metal Exchange Report:

PIG IRON—The general improvement which has been noted during the past two weeks continues, although at the moment of sales are light, but prices are firm as quoted herewith.

MANUFACTURED IRON—Prices are firm, particularly in bars and skelp iron, but plates are somewhat irregular. A circular recently issued by a large firm in Pittsburgh offering to accept orders for spot steel plates at same figures as may be quoted for iron, has caused an uneasy feeling, as it is impossible to decide how low might be quoted by mills desiring an order. It looks threatening, although some well informed parties attach very little importance to offers of this kind.

STEEL RAILS—The market continues quiet. Prices are nominally \$9 at mill, but this would be shaded on a large-sized order.

OLD RAILS—No transactions of any size to report. Held in lots in store are standing off, but a firm offer would evidently result in business.

SCRAP IRON—In fair demand at quoted rates.

San Francisco Metal Market.

WHOLESALE.		THURSDAY, Oct. 4, 1888.	
ANTIMONY—French Star.....	13 @ 14	13 @ 14	13 @ 14
BORAX—Refined.....	7 @ 7 1/2	7 @ 7 1/2	7 @ 7 1/2
Powdered.....	7 @ 7 1/2	7 @ 7 1/2	7 @ 7 1/2
Concentrated.....	6 1/2 @ 7	6 1/2 @ 7	6 1/2 @ 7
COPPER.....	26 @ 27	26 @ 27	26 @ 27
Sheet.....	26 @ 27	26 @ 27	26 @ 27
Ingot.....	16 90 @ 100	16 90 @ 100	16 90 @ 100
Fire Box Sheets.....	— @ 28	— @ 28	— @ 28
IRON—Glasgow iron.....	— @ 28	— @ 28	— @ 28
Eglington ton.....	— @ 27 1/2	— @ 27 1/2	— @ 27 1/2
American Soft, No. 1, ton.....	— @ 31 00	— @ 31 00	— @ 31 00
Oregon Pig, ton.....	21 @ 23 00	21 @ 23 00	21 @ 23 00
Clay Lane White.....	— @ 24 50	— @ 24 50	— @ 24 50
Shot, No. 1.....	— @ 23 00	— @ 23 00	— @ 23 00
Bar Iron (base price) # lb.....	22 @ 3	22 @ 3	22 @ 3
LEAD—Pig.....	5 @ 5 1/2	5 @ 5 1/2	5 @ 5 1/2
Sheet.....	5 @ 5 1/2	5 @ 5 1/2	5 @ 5 1/2
Pipe.....	7 @ 7 1/2	7 @ 7 1/2	7 @ 7 1/2
Shot, discount 10% on 500 bag Drop, # bag.....	1 60 @ 1	1 60 @ 1	1 60 @ 1
Buck, # bag.....	1 80 @ 1	1 80 @ 1	1 80 @ 1
Chilled, do.....	2 00 @ 2	2 00 @ 2	2 00 @ 2
STEEL—English, lb.....	10 @ 10	10 @ 10	10 @ 10
Black Diamond, lb.....	10 @ 10	10 @ 10	10 @ 10
Pick and Hammer.....	8 @ 10	8 @ 10	8 @ 10
Machinery.....	4 @ 5	4 @ 5	4 @ 5
Toe Calk.....	4 @ 5	4 @ 5	4 @ 5
TRIPPLATE—Coke.....	5 75 @ 6 50	5 75 @ 6 50	5 75 @ 6 50
Charcoal.....	6 75 @ 7 25	6 75 @ 7 25	6 75 @ 7 25
QUICKSILVER—By the flask.....	43 00 @ 44	43 00 @ 44	43 00 @ 44
Flasks, new.....	1 06 @ 1	1 06 @ 1	1 06 @ 1
Flasks, old.....	85 @ 1	85 @ 1	85 @ 1

Mining Share Market.

It seems somewhat strange that while mining matters on the Comstock are so active the mining share market here should show so little life. The fluctuations in prices only cover a few cents each way, and there is very little interest in the transactions one way or the other. On the Comstock, according to the Enterprise, the preparations for the resumption of active milling and mining operations along the lode have been thorough and are nearly complete. It is predicted that mors ore will be got out and milled during the coming season than was ever before milled on the lode, with possibly the single exception of a year or two during the bonanza days.

The directors of the Sutro Tunnel Company announce that stockholders have an opportunity, for 90 days from October 1st, to subscribe for the new first-mortgage bonds, which run for 30 years and bear four per cent interest. The proceeds are expected to pay all indebtedness. According to the statement published, the receipts last year exceeded the disbursements by \$172,890, and as the interest on the bonds amounts at the maximum to but \$88,000, there should be a fair dividend remaining.

Mining Bureau Contributions.

The following are among the recent additions to the museum of the California State Mining Bureau:
Cinnabar from the first mine worked for quicksilver on the continent, Santa Rosa, Mexico, from J. W. C. Maxwell.
Livingstonite, Huitzuco, Mexico, J. W. C. Maxwell.
Copper and silver ores from Kootsnai, assaying from \$60 to \$1800 per ton, R. D. Atkins.
Malachite, large and fine specimens, Copper Queen mine, Bisbee, A. T., Lewis Williams.
Bliss on pine tree, cut by Kit Carson, with his name and date, 1844, from head of Carson Canyon, Alpine Co., Cal.; Wm. Thornburg and J. F. O'Gorman.
Building stone from Los Angeles, Brownstone and Granite Co.
Building stone, Coronado Island, Hanbury & Garvey.
Gold quartz rich in free gold, Last Chance mine, Monterey county, W. D. Cruikshank.
Bismuthinite, Sinaloa, Mexico, Gus Peterson.
Crab of enormous size, Japan, O. Keil.
Spears, South Sea Islands, Dr. Lane.
Limestone and lime made from it, Tehachapi, Kern Co., Mrs. D. B. Rogers.
Marble, Douglas Co., Oregon, C. Fletcher.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:
Bluebird, Sept. 24, \$23,200; Moulton, 25, \$10,320; Mt. Diablo, 26, \$16,000; Hsnauer, 25, \$1750; Germania, 25, \$11,085; Hsnauer, 26, \$1700; Queen of the Hills, 26, \$2000; Crescent, 26, \$4950; Hsnauer, 27, \$1800; Germania, 23, \$4923; Hsnauer, 23, \$3400; Hsnauer, 23, \$3700; Germania, 30, \$3683; Hsnauer, 30, \$1900.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Eagle M Co.....	California.....	1.....	10, Sept. 20, Oct. 23.....	Nov. 15, J. M Reynolds.....	593 California St.	Sept. 11		
Alt. S M Co.....	Nevada.....	38.....	50, Sept. 23, Nov. 23.....	Nov. 15, L. Osborn.....	309 Montgomery St.	Aug. 8		
Baltimore S M Co.....	Nevada.....	3.....	25, Sept. 22, Oct. 25.....	Nov. 13, A. R. Grim.....	402 Montgomery St.	Aug. 8		
Baker Divide M Co.....	California.....	16.....	25, Aug. 13, Sept. 17.....	Oct. 8, D. M. Kent.....	330 Pine St.	Aug. 8		
Belcher M Co.....	Nevada.....	36.....	50, Sept. 18, Oct. 23.....	Nov. 12, J. Crockett.....	327 Pine St.	Aug. 8		
Bodie Com M Co.....	California.....	9.....	30, Sept. 24, Oct. 24.....	Nov. 30, G. W. Sessions.....	309 Montgomery St.	Aug. 8		
Cleghorn M & M Co.....	Arizona.....	3.....	10, Sept. 1, Oct. 15.....	Nov. 5, G. B. Kruttschnitt.....	628 Montgomery St.	Aug. 8		
Empire G M Co.....	California.....	1.....	25, Sept. 19, Oct. 22.....	Nov. 8, A. F. Low.....	77 Nevada Block	Aug. 8		
Eschbacher M Co.....	Nevada.....	26.....	21, Sept. 6, Oct. 10.....	Oct. 31, C. E. Elliot.....	309 Montgomery St.	Aug. 8		
Gray Eagle M Co.....	California.....	9.....	50, Sept. 4, Oct. 10.....	Oct. 30, O. H. Bogart.....	327 Pine St.	Aug. 8		
Gr West & Q M Co.....	California.....	2.....	15, Sept. 18, Oct. 22.....	Nov. 27, C. E. Elliot.....	309 Montgomery St.	Aug. 8		
Justice M Co.....	Nevada.....	47.....	25, Sept. 25, Oct. 31.....	Nov. 19, R. E. Kelly.....	419 California St.	Aug. 8		
Locomotive M Co.....	Arizona.....	3.....	15, Aug. 21, Sept. 24.....	Oct. 15, A. H. Fish.....	309 Montgomery St.	Aug. 8		
Lady Washington Coo M Co.....	Nevada.....	7.....	25, Aug. 21, Sept. 26.....	Oct. 16, L. Osborn.....	309 Montgomery St.	Aug. 8		
Lead Oak D M Co.....	California.....	10.....	50, Aug. 20, Sept. 27.....	Oct. 19, J. M. Izlo.....	323 Montgomery St.	Aug. 8		
Lord of Lorn G & S M Co.....	Nevada.....	5.....	10, Sept. 4, O t 12.....	Nov. 2, R. N. Van Brunt.....	13 Fremont St.	Aug. 8		
Mono G M Co.....	California.....	26.....	50, Sept. 20, Oct. 23.....	Nov. 28, G. W. Sessions.....	309 Montgomery St.	Aug. 8		
Ophir S M Co.....	Nevada.....	54.....	50, Sept. 1, Oct. 4.....	Oct. 24, E. B. Holmes.....	319 Montgomery St.	Aug. 8		
Pondera M Co.....	Nevada.....	1.....	50, Aug. 10, Sept. 11.....	Oct. 10, J. Stadfield Jr.....	309 Montgomery St.	Aug. 8		
Potosi M Co.....	Nevada.....	3.....	50, O. t. 1 Nov. 6.....	Nov. 27, C. E. Elliot.....	309 Montgomery St.	Aug. 8		
Superior M Co.....	New Mexico.....	3.....	15, Aug. 15, Sept. 15.....	Oct. 15, I. C. Stump.....	309 Montgomery St.	Aug. 8		
Terraqu G M & M Co.....	California.....	1.....	50, Sept. 8, Oct. 8.....	Nov. 3, W. J. Gurett.....	308 Pine St.	Aug. 8		
Virginia Creek Hyd M Co.....	California.....	6.....	50, Aug. 29, Oct. 9.....	Oct. 29, J. M. Quay.....	406 Montgomery St.	Aug. 8		

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Cal California & Va M Co.....	Nevada.....	A. W. Havens.....	309 Montgomery St.	Annual.....Oct. 8
Eureka Com M Co.....	Nevada.....	H. P. Bush.....	306 Pine St.	Annual.....Oct. 15
Eschbacher M Co.....	Nevada.....	C. E. Elliot.....	309 Montgomery St.	Annual.....Oct. 15
Mayflower G M Co.....	California.....	J. Moritz.....	328 Montgomery St.	Annual.....Oct. 16
Nevada Queso M Co.....	Nevada.....	J. F. Ligon.....	328 Montgomery St.	Annual.....Oct. 16
Paradise Valley M Co.....	Nevada.....	A. Chennault.....	328 Montgomery St.	Annual.....Oct. 16
Superior M Co.....	New Mexico.....	3.....	15, Aug. 15, Sept. 15.....	Oct. 15, C. I. C. Stump.....
Terraqu G M & M Co.....	California.....	1.....	50, Sept. 8, Oct. 8.....	Nov. 3, W. J. Gurett.....
Virginia Creek Hyd M Co.....	California.....	6.....	50, Aug. 29, Oct. 9.....	Oct. 29, J. M. Quay.....

LATEST DIVIDENDS—WITHIN THREE MONTHS.					
NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Cal and California & Va M Co.....	Nevada.....	A. W. Havens.....	309 Montgomery St.	50	Sept. 1
Confidence S M Co.....	Nevada.....	A. S. Groth.....	306 Pine St.	25	July 9
Eureka Com M Co.....	Nevada.....	H. P. Hutton.....	306 Pine St.	25	July 9
Mt Diablo M & M Co.....	Nevada.....	R. W. Heath.....	318 Pine St.	25	Aug. 27
North Star M Co.....	California.....	D. A. Jennings.....	401 California St.	50	July 11
Hale & Norcross S M Co.....	Nevada.....	J. F. Lightner.....	309 Mt.gomery St.	50	Aug. 1
Idaho M Co.....	California.....	.....	15, Aug. 15, Sept. 15.....	Oct. 15, C. I. C. Stump.....	
Pacific Borax, Salt & Soda Co.....	California.....	A. H. Olough.....	230 Montgomery St.	1.00	July 10
Standard Coo M Co.....	California.....	J. W. Pew.....	310 Pine St.	05	June 12

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

- FOR WEEK ENDING SEPTEMBER 25, 1888.
389,870.—REGISTERING METER FOR ELECTRIC CURRENTS.—J. D. Bishop, S. F.
390,921.—DUSTPAN.—G. A. W. Cage, Jr., Los Angeles, Cal.
390,162.—CORSET.—Elizabeth Glass, S. F.
389,884.—THRASHER.—Grattan & Shippee, Stockton, Cal.
390,129.—AIR-FEEDER.—C. A. Klotz, Vallejo, Cal.
390,130.—DOOR SECURER.—A. J. Longenecker, Elk Grove, Cal.
390,135.—FRUIT-BOX.—R. E. Morey, S. F.
389,979.—WALL PROTECTOR.—Robbins & Broad, S. F.
389,906.—PROVISION SAFE.—T. G. Rounds, Riverside, Cal.
390,038.—SAFETY TIP FOR PENCILS.—J. M. Schofield, Merced, Cal.
389,984.—STOVEPIPE HOLDER.—A. J. Spicer, Portland, Ogn.
390,044.—ROTARY ENGINE.—F. L. Voorhies, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast at inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT BOX.—R. E. Morey, S. F. No. 390,135. Dated Sept. 25, 1888. This box is formed of an exterior frame having a central partition, the top of which is arched. The cover is sufficiently flexible to allow it when slid in under the side guides to be bent up by the arched central partition, thus causing it to hand in places. The body of the box is formed of veneer strips bent and secured to the frame. The boxes thus made are strong and can be piled up on one another without injury. It differs from the ordinary berry-box in being complete in itself, whereas the veneer berry-boxes are usually packed in independent crates.

SAFETY-TIP FOR PENCILS.—James M. Schofield, Merced, Cal. No. 390,038. Dated Sept. 25, 1888. This safety-tip consists of a piece of rubber, to be applied to the pencil directly, or to the usual metal cylinder of a pencil in the usual manner, and to serve as an eraser, the rubber being provided or formed with prongs of the same material. The object is to hold the pencil in the pocket by reason of the prongs catching in the material of the pocket. On account of the yielding character of the prongs they will not appreciably resist a positive effort to withdraw the pencil, but they will prevent it from dropping out. Nor will they injure the clothing nor affect the function of this tip as an eraser.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rates, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 13.	WEEK ENDING Sept. 20.	WEEK ENDING Sept. 27.	WEEK ENDING Oct. 6.
Alpa.....	1.55 1.80 1.60 2.20	2.05 2.50 2.25 2.85		
Alta.....	1.55 1.70 1.55 1.65	1.65 1.60 2.00 1.30	1.70	
Andes.....	1.00 1.10 .95 1.00	.85 1.00 .90 1.05		
Argenta.....	.70.....	.70.....		
Belcher.....	4.40 5.25 5.25 6.00	4.50 4.25 5.40		
Brophy.....	3.25 3.75 3.30 3.75	3.30 3.65 3.35 4.00		
East & Belcher.....	1.20 1.40 1.25 1.40	1.25 1.30 1.25 1.50		
Bullion.....	.60 .65.....	.65 .25 .55 .25	.35	
Baltimore.....	1.50 1.60.....	.45 .40 .45 .40		
Bodie Isls.....	1.50 1.60.....	1.50 1.10 1.30 1.15	1.30	
Bodie Com.....	1.30 1.31 1.25 1.35	1.15 1.15 1.1.....		
Bodie Tunnel.....	.70 .75.....	.65 .30 .55 .55	.60	
Bulwer.....	3.00 3.00.....	2.95 2.05 2.05 1.05	1.05	
Con. Va. & Cal.....	3.75 4.30 4.20 4.20	4.25 4.35 4.25 4.00	5.40	
Challenger.....	2.65 2.73 2.70 2.90	2.55 2.75 2.60 2.90		
Champion.....	1.15 1.12.....	1.11 1.11 1.12 1.12		
Confidence.....	.40 .45.....	.40 .40 .40 .45	.75	
Con. Imperial.....	.35 .40 35.....	.40 .40 .39 .35	.40	
Caledonia.....	.45 4.30 4.30 4.75	3.76 4.15 4.15 6.00		
Con. Pacific.....	.80 .95 .80 .95	.76 .85 .75 .85		
Crown Point.....	.35.....	.38.....		
Crocker.....	2.75 2.60.....	2.55 2.55 2.55 2.55		
Dudley.....	1.20 1.30.....	1.10 .95 1.10 1.25		
East B. & E.....	.85 1.00.....	.75 .60 .55 .60	1.25	
Eureka Com.....	.50 .75 .00.....	.55 .60 .50 .55		
Eschbacher.....	2.55 2.90 2.50 2.80	2.50 2.75 2.40 2.90		
Geop. Pros.....	4.15 4.45 4.20 4.60	4.25 4.50 4.40 5.00		
Gold & Curry.....	1.00 .90.....	1.15 .65 .75 .80		
Hale & Norcross.....	1.00 .90.....	1.15 .65 .75 .80		
Holmes.....	1.00 .90.....	1.15 .65 .75 .80		
Independence.....	1.25 1.45.....	1.30 1.30 1.30 1.30		
Iowa.....	1.00 .90.....	1.15 .65 .75 .80		
Jules.....	.95 1.05 .95 1.00	1.00 1.00 1.00 1.00		
Kenbeck.....	3.00 3.25 93 3.00	2.50 3.00 3.30 3.00		
Lady Wash.....	2.20 2.15 2.15 2.15	.50 .45 .50 .45		
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NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 4th day of September, 1888, an Assessment (No. 9) of Five Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, 327 Pine street, rooms 9 and 10, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 10th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 30th day of October, 1888, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

O. H. BOGART, Secretary.
Office—327 Pine St., Rooms 9 and 10, S. F. Stock Exchange Building, San Francisco, Cal.

ASSESSMENT NOTICE.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, California. Location of works, Gold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors of the above-named corporation, held on the 6th day of September, 1888, an assessment (No. 4) of Ten Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 12th day of October, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Friday, the second day of November, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

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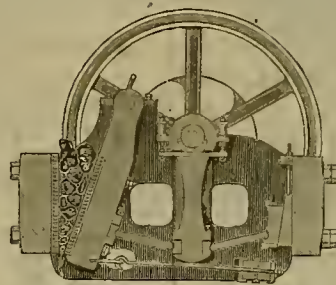
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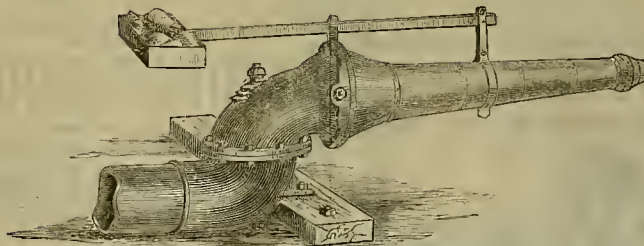
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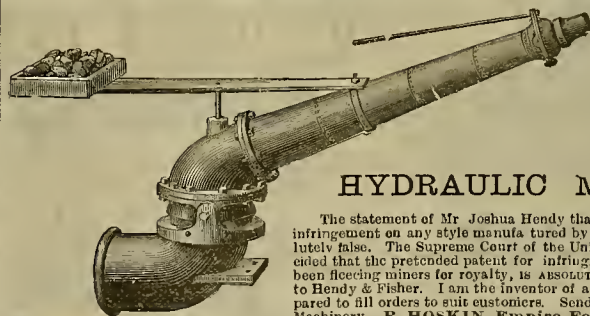
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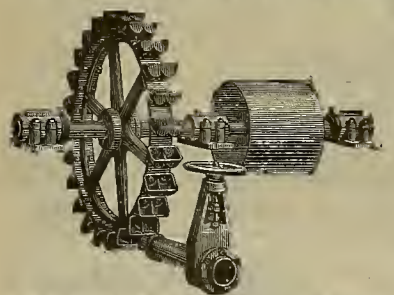
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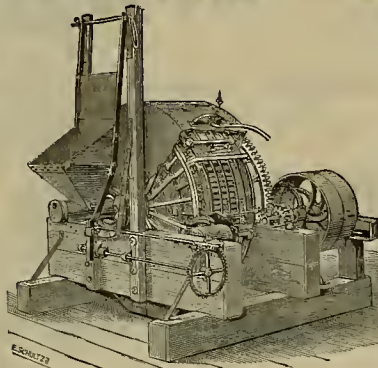
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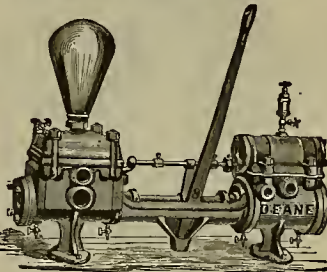
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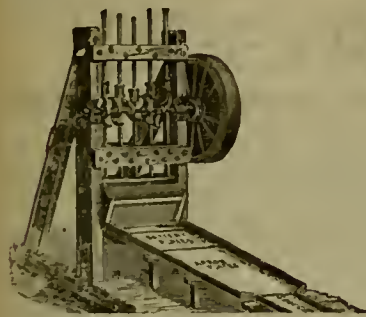
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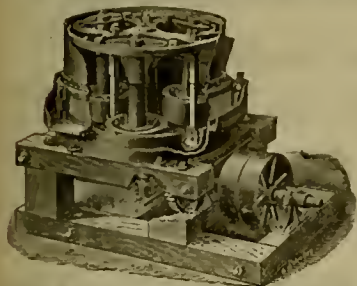
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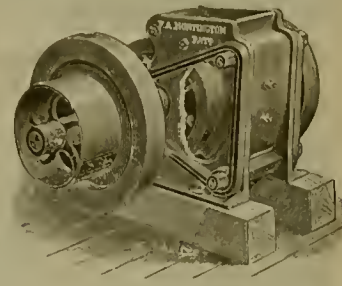
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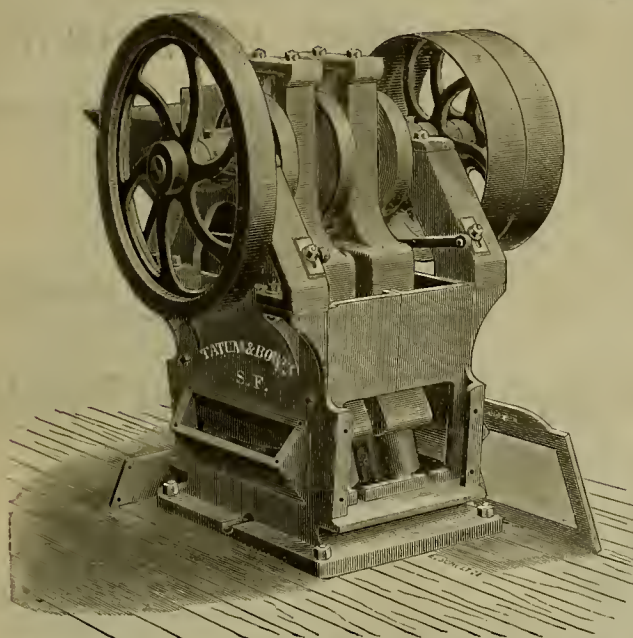
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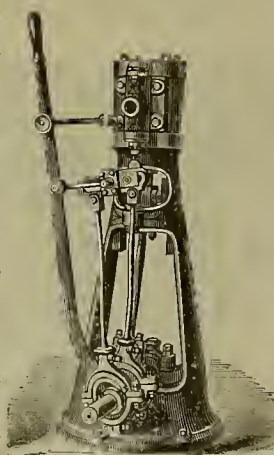
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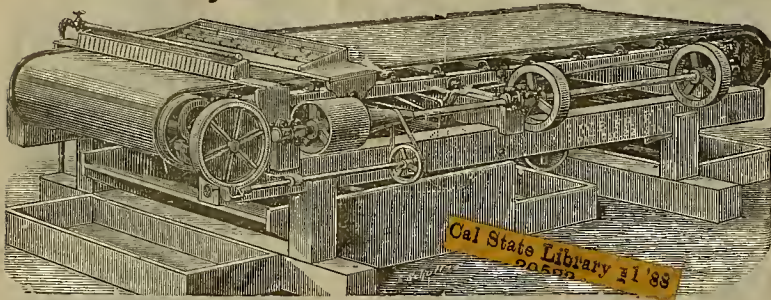
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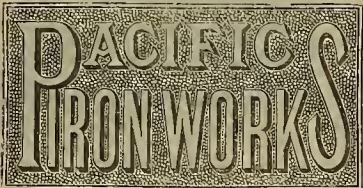
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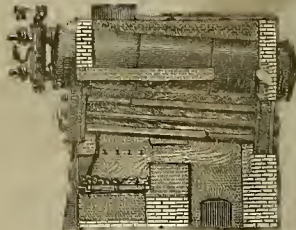
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TWENTY-PAGE EDITION.

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SAN FRANCISCO, SATURDAY, OCTOBER 13, 1888.

VOLUME LVI.
Number 15.

Quicksilver Flasks.

At the New Almaden quicksilver mines, in this State, the product from the several furnaces (after passing through the condensers) is received in kettles, the product of each furnace being kept separate. From the kettle the quicksilver is ladled by a scoop, weighed and placed in flasks. We give on this page a view made from a photograph taken at New Almaden

the tariff. Foreign quicksilver pays a duty of 10 per cent, the flasks in which it comes being admitted duty free. American-made flasks shipped abroad and returned empty have to pay a duty of 45 per cent.

When the stoppers are unscrewed and contents of the flask discharged, the flasks can be used again, and the Quicksilver Company is prepared to pay a good price for all it can get. If, however, holes are drilled in the flasks, they

Mining-Law Suggestions.

There is a growing feeling in the mining communities that the present laws relative to the acquisition of titles to mineral property should be so simplified and amended as to enable citizens to obtain title to quartz and placer claims by simple application in the district land office, limiting the amount to a certain number of acres, be it 20 or 40. All such lands, situated

in the present case, is the following: This is to suspend indefinitely the time for final proof of homestead and pre-emption settlers upon mineral ground, leaving the miner free to prospect and develop the mineral resources that the land may contain, while the common law would hold him responsible for any damage he might do the farmer's improvements. This would, in reality, be of great benefit to all such settlers as are engaged in legitimate farming, for pros-



Photo-facsimile.

WEIGHING QUICKSILVER AND FILLING FLASKS, NEW ALMADEN MINE.

by Mr. Bulmore, showing the process of weighing the quicksilver and filling the flasks. The stoppers are firmly screwed into the flasks by means of a long lever, one man working at each end of this.

Many people have no doubt wondered why quicksilver flasks should always contain 76.50 pounds instead of some even number of pounds. The reason of this is that the original Spanish flask or hottles contained 75 Spanish pounds, which equal 76.03 pounds avoirdupois.

The average weight of quicksilver flask is 13½ pounds. The flasks used were originally imported from England, and cost, duty paid, \$1.75 each. They are now made by the National Tube Co. at McKeesport, Pennsylvania, and cost \$1. The American flasks are superior to those made in England.

While on this subject it may be well to call attention to a curious fact in connection with

are needless. Mining companies using mercury in any quantities should provide a good long double lever, such as is shown in the cut, to remove the stoppers. The flasks are then worth something. At a great many mills, however, if the stopper does not readily come out, a center-punch is used to perforate the body of the flask, which is then unfit for use.

The Idaho Mining Co., Grass Valley, has declared its 228th monthly dividend, the amount being \$7.50 per share, aggregating \$23,250. The mine continues to yield largely, and is looking as well as at any time in years. The Idaho has produced over \$10,000,000 in all.

ASSESSMENT work on claims is now in order and should be done before the snow comes. There is no use in putting off this necessary duty until the last moment.

within a given distance from the foothills (or pronounced valley lands) to be held by the Government as mineral land and open to purchasers, up to the limit prescribed by law, to all citizens at a uniform price, say of \$10 an acre. This would be better for the Government, being double the price obtained for mineral land at present, and it would be far better for the miner, as it would save him great expense, loss of time and much trouble. This cheap and easy method of obtaining titles would greatly stimulate the mining industries. It would also enable every bona fide settler to purchase from the Government a title to the few acres that he actually cultivates around his house and effectually stop the present evil of closing large bodies of mining lands against prospecting and development.

Another method of relief that is frequently suggested and which involves no radical change

perity to the mining interests in their vicinity insures a ready market and a good price for all they can produce.

AN English company has been formed with a capital of £300,000 in £1 shares, 10,000 of which are now offered for public subscription at par, to acquire and continue to work as a going concern the Cortez mines situated in Esmeralda county, Nevada. The property contains 29 claims, and the prospectus states it has been for the past two years producing bullion of the value of \$60,000 a month, while the expenses are under \$12,000 a month, showing a net profit of about £115,000 per annum. The consideration to be paid for the property is £290,000, the entire amount being payable in shares.

THE United Miners of New Mexico, at their meeting held in Albuquerque, resolved to hold a Territorial exposition at Socorro next spring.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Manganiferous Silver Ores.

[Written for the Press by A. L. TRIFFEL, JR.]

The *modus operandi* for the reduction of manganiferous silver ores, to obtain satisfactory results, involves a thorough knowledge of the character of the compound elements which enter into the combination.

The procedure in itself is comparatively simple, especially so if the silver element enters as a chloride in combination with some base metal oxides. In this case a raw amalgamation yields the best of results. If the silver, however, is obtained as a sulphuret in combination with copper, nickel or cobalt, necessitating a chloridizing roast, or if a minimum amount of base metal sulphurets, if any, are present, the process becomes more complex, requiring not only a knowledge as to the proper method of dressing and treating the ore, but close and faithful attention.

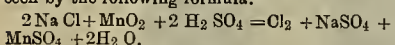
To more fully understand the reactions and treatment of this method of chloridization of manganiferous ores, a general description may be of material aid.

Ores of this character consist of the peroxide of manganese, in varying proportions, from 30 to 70 per cent, mechanically mixed with more or less sesquioxide of iron. Sulphate of baryta (Ba SO_4), silica (Si O_2), carbonates of calcium (Ca CO_3) and magnesia (Mg CO_3) are generally the principal compounds found associated as gangue. Oxides of cobalt (Co O) and copper (Cu O) in small quantities are also found, mechanically disseminated throughout the ore, but replaced, more or less, by silver as a sulphuret when the ore is argentiferous. Chlorides are also frequently found in this class of ore, varying in quantity, in speck, and streaks throughout the mass. The ore is light and pulverulent, of a black or dark-brown color, unctuous to the touch and easily crushed. When considerable iron is present the ore assumes a slightly reddish or light-brown color.

The sulphate of baryta (Ba SO_4) or barite (heavy spar), which is not always found associated with manganiferous ores, consists of 34.3 per cent sulphur trioxide (SO_3) and 65.7 per cent baryta (Ba O). It is insoluble, is not decomposed except by high heat, and in consequence, through its refractory disposition is of no use as a sulphate for the decomposition of salt. The carbonates of calcium and magnesia, however, are but too readily decomposed, yielding carbon dioxide (CO_2) and absorbing sulphuric acid ($\text{H}_2 \text{SO}_4$) forming the sulphates of calcium and magnesia.

For these reasons, with this class of ore, we see that an addition of green vitriol, iron pyrites or other sulphur compounds, when roasting is necessary, are essential to effectually cause a decomposition of salt. This decomposition is effected by the oxidation of evolved sulphur to sulphuric acid gas by the action of heat on sulphurets.

The presence of the oxide of manganese and iron, in this case, becomes of great importance for the production of chlorine gas, as will be seen by the following formula:



From this we see that the action of sulphuric acid ($\text{H}_2 \text{SO}_4$) on the oxide of manganese (Mn O_2) and salt (Na Cl) produces the sulphates of manganese and sodium, setting free chlorine. Free hydrochloric acid vapors are also created.

The hydrochloric or muriatic acid gas arises partly by the action of water absorbing sulphuric acid on the salt, whereby the sodium is oxidized by the oxygen of water vapors, whilst the hydrogen unites with chlorine to form hydrochloric acid in the form of gas. It is also formed by the contact of chlorine gas, with compounds of hydrogen, for instance, carbonated hydrogen.

This acid also acts upon oxides of manganese, evolving free chlorine and forming chlorides of manganese (Mn Cl_2), thus: $\text{Mn O}_2 + 4 \text{H Cl} = \text{Mn Cl}_2 + \text{Cl}_2 + 2 \text{H}_2 \text{O}.$

By these reactions the sulphurets of silver and other metals, as well as the base metal oxides, are reduced to sulphates. Upon increasing the heat at this point the sulphates of silver and base metal enter upon a direct exchange of compounds with remaining undecomposed salt, forming proto-chloride of iron (Fe Cl) and manganese (Mn Cl) and sodium sulphate ($\text{Na}_2 \text{SO}_4$). The chloride of silver (Ag Cl) thus formed remains undecomposed, while the protochlorides will, by coming in contact with gaseous products of burning fuel, containing water, or hot air containing steam, be resolved into their respective oxides by mutual decomposition.

A resume of the above process clearly shows that roasting in the first stage in the presence of salt has an oxidizing effect, as there is then no sulphuric acid present to decompose the salt. The sulphurets, under the influence of heat, lose a part of its sulphur escaping as sulphurous acid gas, while a further portion oxidizes to sulphuric acid gas. This (sulphuric acid) in turn attacks the salt and the oxide of manganese, in company with salt, creating directly and indirectly free chlorine, which, uniting with the oxides and sulphates, produces metal chlorides. These chlorides, with the exception of silver, are next oxidized by con-

tact with hydrogen compounds, liberating chlorine gas, which further chloridizes any remaining sulphurets of silver and base metals which may be present.

With manganiferous ores, particularly those having considerable lime or magnesia carbonates, therefore requires so much more green vitriol as will be absorbed by these carbonates to sulphates. Silica or quartz are not acted upon directly by the acids formed, but materially aids in the decomposition of salt in the presence of hydrogen compounds, forming silicate of soda and hydrochloric acid. With ores containing insufficient amount of sulphurets with a large percentage of calcium carbonate, two or three per cent at least of green vitriol should be added, otherwise poor chlorination would result. It may frequently be found beneficial, when the ore is calcareous, to add a silicate in roasting if possible.

If, however, as seems to be the case in several localities, the ore is roasted dead (iron pyrites being unobtainable), a small and I should judge a very unsatisfactory chlorination would result. The minimum amount of sulphuric acid created by the desulphurization of silver sulphides to silver sulphates would be almost entirely, if not all, absorbed by carbonate of lime if present, and, if absent, by the base metal oxides in forming but limited amounts of sulphates.

A small proportion of chlorine gas, created by the action of these sulphates on salt, however, will chloridize with the assistance of silica, I believe, a small percentage only of silver sulphate. It is in this manner that by dead roasting without base metal sulphurets only a minimum amount of silver can be chloridized. If a manganiferous ore is argentiferous containing silver as a sulphide or argentic ($\text{Ag}_2 \text{S}$), the ore is free milling, and as such it should be treated; otherwise a roasting process should be followed. It may be well before determining the exact process, which is to be carried out, to first ascertain by experimentation whether the ore, if not entirely free milling, would not give equally good results from a financial standpoint by raw amalgamation. Additional care should be taken for this determination (even though the ore contains small percentages of base-metal sulphides) when 20 to 30 per cent of the silver is chloride.

If raw amalgamation should be determined upon, difficulties identical to those in roasting will be met with. These may be overcome by proper quantities of chemicals—first for the neutralization of existing alkalies, and secondly, by the reduction of silver sulphurets to a chloride. To effect this change judicious grinding, aided by means of chemicals, will be found, I believe, effective to a certain extent.

The reactions (chemically) which take place in raw amalgamation, are nearly identical to those in a chloridizing roast. The salt, being dissolved, is attacked by the limestone (Ca SO_4) and we obtain a cupric chloride (Cu Cl_2) and sodium sulphate thus:

$2 \text{Na Cl} + \text{Cu SO}_4 = \text{Na}_2 \text{SO}_4 + \text{Cu Cl}_2$. When sufficient cupric chloride is formed, it acts directly upon the silver sulphide, and by our exchange of compounds produce silver chloride, thus: $\text{Ag}_2 \text{S} + 2 \text{Cu Cl}_2 = 2 \text{Ag Cl} + \text{Cu}_2 \text{Cl}_2 + \text{S}$. The sulphur produced by this reaction probably becomes oxidized to sulphurous acid, and acts upon remaining undecomposed sulphurets. The silver chloride in the presence of iron, is precipitated to a metallic state, in which condition it amalgamates with mercury. In these reactions and combinations, the oxide of the base metals do not interfere, and take but a small part in them. Whether or not the oxide of manganese and iron undergo any direct chemical change I am not prepared to say, but I think they do not.

Ore-Feeders.

EDITORS PRESS:—It will possibly be remembered by certain of your readers that an article appeared in your journal issued February 11, 1888, communicated by the writer of this and relating to a competitive test which had been held between the Challenge and Loftus ore-feeders in the mill of the Experimental Mining Company, near Columbia, Tuolumne county, this State. That article recited that the superiority of the Challenge was unquestionably demonstrated that the manager of that property ordered a Challenge to replace the Loftus, and the latter was "hung up to dry."

In June last, by a certain circumlocution known to the trade, eight Loftus feeders were placed on trial in the 40-stamp gold-mill of the Ilex Gold Mining Company, near Mokelumne Hill, Calaveras county. After a trial of them for a period of nearly 60 days, it has been decided by the resident manager of the property here and the board of directors of the company in London, England, that the eight Loftus feeders are to be discarded by reason of their inefficiency, and are to be replaced by an equal number of the Hendy Improved Challenge feeders, which are now being made ready for shipment by the Joshua Hendy Machine Works of No. 51 Fremont St., this city.

The writer deems it to be important, as it is necessarily of interest to all managers of mining properties, to direct attention to these facts, for the simple reason that those who are interested in or may contemplate becoming interested in mining enterprises are naturally desirous of securing such machinery, fixtures and appliances for their mining and milling plants, which are known and proven to be economical, effective

and superior for their specially designated service.

And thus one by one these mechanical abortions pass away; a large proportion are now "numbered among the things that were." Some were prematurely delivered, still-born; others of a mushroom growth, lifting their heads for a single night, blighted under the rays of the morning sun. Of the many forms of automatic ore-feeders which have been conceived, devised and introduced to the attention of intelligent mining men, none now exist save the Challenge, the Stanford, the Roller and the Tullock, and of these the Challenge, with the recent important improvements which have been introduced into their construction, make them far superior to any other form ever yet devised, and all others have been consigned to their last resting place, the scrap-pile, awaiting the final consuming fire. N.

Nevada Mining Notes.

EDITORS PRESS:—The State of Nevada has deservedly received the appellation of the "Silver State," and if the term was appropriately applied 20 years ago, the discoveries and developments of later years serve only to prove more conclusively the propriety in the use of the name. From the surface to the depth of over 3000 feet, this valuable metal (silver) has been found to exist in paying quantities, and this area of its extent is limited only by the boundary separating the States from Idaho on the north, Utah on the east, Arizona on the south, and California on the west. Having visited most of the prominent mining districts of the State within the past six weeks, I will give you a synopsis of the most important facts gleaned therefrom.

Near Carson.

During the latter part of July, Jefferys Lewis, of theatrical fame, gave an exhibition in Carson City, and receiving confirmation of the discovery of a rich silver ledge near by, made haste before departure from the neighborhood to locate and record his claim upon the same. The land upon which the discovery was made a short time previously was sold by Mr. S. P. Davis, editor of the *Appeal*, for \$1 per acre. Mrs. Langtry, "the Jersey Lily," who was the fortunate purchaser, was having an artesian well sunk, in the pursuit of which, the silver ledge was struck. The ore assays \$520 per ton. In a short time over 40 locations were made on the ledge, which is located $\frac{2}{3}$ miles north of the city. Doubtless this discovery will prove valuable, and I only refer to it to show that silver ore in Nevada is a commodity to be found almost anywhere, and frequently where least expected.

Virginia City.

Which has been and is still the chief mining camp in Nevada, is regarded as in a more healthy condition, so far as its immediate outlook is concerned, than for several years previous. During my sojourn of two weeks in August most of the mills were either closed or doing but little work, on account of the lack of water, but this suspension was regarded as only temporary. The coming fall and winter promise great activity throughout the Comstock. The yearly output of bullion has increased until, in 1886, the official report estimated the amount of silver and gold obtained from the Storsy Co.'s mines, which are confined principally to the Comstock lode, at \$4,393,000 for that year, deducting all assessments. Nor are the mines of this lode giving any indications of failing in the production of gold and silver bearing ore. A detailed account of the 65 prominent mines of the Comstock lode would occupy more space than you could well afford to devote in a single issue, and besides it would appear unnecessary at this time, for the simple reason you have published so much concerning them from time to time in prior issues, so that the public are perhaps better posted as to their true condition than about any other important mining district on the coast.

The Silver City Mining District.

Two miles west of Virginia, is developing a better prospect than ever before, although no excitement prevails. From Mr. E. P. Hamilton, president of the Hayward mine, I gleaned the fact that more bullion is now being extracted from the Hayward, Oest, and Leconte than for the past ten years. J. D. Blackburn, a prominent citizen of Silver City, and stockholder in the Red Jacket mine, placed me under obligations for a favor during my visit. The Red Jacket is one-half mile west of the town, was developed in '73, and patented in '81. By reason of unfortunate litigation, now happily terminated, this valuable property has lain idle, but the prediction is that the public will soon hear of startling results from its resumption of operations.

Winnemucca Mines.

The town of Winnemucca, Capital of Humboldt Co., owes a share of her prosperity to mines located in various directions from the place. In a aggregated range of mountains, four miles distant, is located the Winnemucca mines, which contain innumerable veins of silver ore. The Winnemucca Mining Co., composed of some of the best men of the town, is vigorously pushing the work of development. Already they have expended \$12,000 on one ledge. Owing to the refractory condition of the ore and cost of transportation, the success has not been complete, but now with cheaper

means of transit and improved processes lately introduced, much can be expected from this enterprise.

Golconda.

A few miles east of Winnemucca, is a very promising copper mining district. The ore contains considerable silver and gold also. The most important developed mine lies ten miles south of the station, and is owned by New York capitalists. The company propose to construct a railroad shortly to connect with the C. P. R. R. The lode has been traced six miles, and although the ore is of a low grade, the mines can be worked with good profit when the ore can be reached by rail. In this opposite direction from the station the country prospects well, in view of which Golconda is destined to become an important center. The place has other attractions, being the site of one of the best medical springs in the State.

Battle Mountain.

There are some rich copper mines seven miles southwest of Battle Mountain. The company employ 25 men at present in extracting the ore, and ship the same to England. The ore is being crushed at the Reno mill, but it is proposed to erect a mill at Battle Mountain soon.

The Pittsburg Consolidated gold mines are located a few miles southeast of Battle Mountain. They are said to be paying a good per cent on the investment. About 50 men find employment here.

The Mines at Austin

Have been in a stagnant condition for some months past, owing, it is asserted, more to bad management than to any other cause. Last year there were at this time over 300 men on the payroll of the Silver Mining Company, the principal active corporation engaged in mining here at that time, whereas this season there were only about 40, in consequence of which many miners were obliged to seek employment in other camps. To Mr. Samson, superintendent of the company, Mr. Vincent of the Nevada Central railroad, G. A. Carpenter, editor of the *Reveille*, and others I was placed under obligations for facts regarding the condition of things. All agreed that, notwithstanding the present state of affairs, the outlook was hopeful. The S. M. Co. transferred the property to a party of Chicago capitalists some months ago, and the incorporation that now controls it is known as the Manhattan Mining and Reduction Company. Austin was some years ago about the best camp of its size in Nevada, and those best acquainted with the undeveloped resources of the district say they know no reason why it should not again revive. It is the universal verdict of visitors that no community anywhere is more deserving of prosperity, the people being remarkably kind and affable. The town is connected with the C. P. R. R. by the Nevada Central R. R. Its management is in striking contrast with that of the Eureka & Palisades railroad, which connects Eureka with the C. P. R. R. While all the people of Austin spoke in highest terms of the former, it was hard to find any business man of Eureka who could employ terms severe enough to express his denunciation of the latter, on account of the extortionate rates of fare and freight imposed upon the public. The Nevada Central R. R. is a narrow-gauge 90 miles in length. The superintendent is C. W. Hincheliffs, with headquarters at Austin. The writer found the trip a pleasant one by moonlight.

Eureka.

Ninety miles north of Palisades, C. P. R. R. has also seen far livelier days than at present. Like Austin, her people are generally sanguine of a bright future, and when it is considered that within the Eureka mining district there are over 400 patented mines and about 75 unrecorded, there seems to be ample cause for the view held by the business men of the town. The two principal mines upon which the prosperity of Eureka has always depended entered into a combination some months ago, raising the price for smelting to a figure almost equivalent to prohibition, or at least a rate that had the effect to stop the delivery of ore at their mills; consequently the little work that has been prosecuted of late has circulated no ready money, the miners simply leaving their ore on the dump. Those who tried the experiment of shipping to smelters abroad, though realizing more than offered at home, found it too expensive to engage in on a large scale. Some idea of the past importance of Eureka as a mining camp may be estimated from the fact that the Richmond M. Co. and the Eureka Consolidated, two of the leading companies, have declared in dividends up to date over \$7,000,000.

Up to a comparatively recent date, little attention has been paid to agricultural pursuits conducted on scientific principles in Eureka county. A few have followed stock-raising in the primitive way, and, as an accessory, improved some hay ranches; further than this the general progress has not been creditable. Now, however, steps are being taken toward a more thorough development of the latent resources of the soil, and it seems to be the resolve of the enterprising citizens not to allow the country to depend altogether upon the less certain fortune of the mines. A company has lately been organized to bore for artesian water, which, if successful (and from the fact of water being known to exist near the surface of large arid tracts, the experiment is almost certain to succeed), must revolutionize the farming industry and make the country at least a hundred-fold

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador *Ledger*, Oct. 6: Drifting in the Wildman mine has been delayed on account of a portion of the shaft needing repairs, which they have been doing the last week. At the Lincoln a drift is to be run from the foot of the hill near the old shaft formerly worked by R. C. Downs. There is a raise of about 100 feet, and if they can strike the ledge at that depth it will give work perhaps for years. H. C. Callahan is up from San Francisco looking after matters pertaining to the Sutter Creek mine. There is a proposition on foot to connect their mill pipe with the Mahoney pipe, which will furnish them with water the year round. They have a very good ledge in sight. The Leggett and Manditch claim, about six miles above here, was sold last week principally to S. D. R. Stewart. The price to be paid is \$10,000. There is to be a ten-stamp mill put upon the claim right away.

AMADOR GOLD MINE.—*Ledger*, Oct. 6: Preparations for the building of the 60-stamp mill at this mine are making satisfactory headway. F. Masoni has secured the contract for building the retaining wall, and is now busy at work on the same. This wall when completed will be 107 feet long, 3 feet thick and 12 feet high. When this wall is finished the work of putting the mill together will be inaugurated. They commenced on the battery-blocks last week. It is expected to have the mill in running order about Christmas. At present there are 30 men employed at the mill and 25 at the mine, besides four teams.

MISCELLANEOUS.—The Gillick mine is still working with promising prospects. Another effort is being made to bond the Doyle mine in Hunt's gulch in the interest of English capitalists.

DRYTOWN.—Cor. Amador *Dispatch*, Oct. 6: The Overplus mine at Quartz Mountain has resumed work again. Mr. Goodman, the owner, is putting up a five-foot Huntington mill, and will move the Frue concentrators from the Quartz Mountain mill to the Overplus. The ore will pay \$6 to \$8 per ton free gold, and about three-fourths per cent in sulphurets which are worth \$500 to \$600 per ton. The Cosmopolitan is down 500 feet; they will soon sink a shaft; then drifting will be in order about the first of November. The Gover Co. broke ground on its new reservoir on Monday; they will push it with all possible speed so as to get the pipe laid before the rain. In all probability the mine and mill will be run by water from Quartz Mountain by January 1st. The mill is kept running steady of late.

Calaveras.

ACTIVE.—Calaveras *Chronicle*, Oct. 6: The mining industry is quite active. The Blazing Star has started again and will soon commence to take out ore. The newly-erected 10-stamp mill at the Cook mine commenced crushing rock on the first of the month, but owing to the scarcity of water five stamps only were started. Mr. Schae is the present owner.

WATER SCARCE.—Angels *Echo*, Oct. 6: The scarcity of water in our section rather retards milling progress to some extent.

GOLDEN EAGLE.—The Golden Eagle mine, situated near Albany Flat, and owned by Messrs. Gerkins and Swartz, is showing up splendidly. Two shafts have been sunk, one to the depth of 40 feet, the other 25 feet. A large vein 12 feet in width shows up well.

El Dorado.

DRIFTING.—Georgetown *Gazette*, Oct. 4: J. J. Busick of the McCall mine at Gray Eagle Bar, was in town to-day. There are 15 men engaged in drifting.

Los Angeles.

COAL AND IRON.—Newhall *Times*, Oct. 6: We met Colonel Brophy Saturday, who gave us a few notes on what has been discovered on his ranch about two miles southwest from Newhall. About 14 years ago outcroppings of coal were found, but the lead was not opened up until recently. There were three well-defined veins of coal of 5, 7 and 4 feet thick, and the coal that has been taken out is of a very superior quality. It mines easily, and is of a superior quality, burning to a yellow ash, without any clinkers. The coal has also discovered five leads of magnetic iron running from 15 to 30 feet thick, and which goes 50 per cent iron. There are two different parties of capitalists who have made overtures to purchase the mine, and it is very probable that it will be sold within a short time.

A GOOD REGION.—Ed. Lyon came down from Ravens Wednesday and brought quite a number of specimens of quartz to be assayed. He says there is quite a mineral region about ten miles southeast of South Side station. He has two claims of gold-bearing rock, one with a well-defined ledge of 6 to 9 feet, and which goes \$20 to \$30 per ton; the rock is free-milling gold, with good traces of silver. It is so easily worked that \$3-ore would pay well. There is plenty of wood and water on the claims, and the cost for working could be figured down to the minimum point. He has a tunnel in 20 feet and a shaft 16 feet, and the ore improves as he gets into it. His other claim has a ledge with an average of two feet and which goes from \$27 to \$30 per ton. Claims of Jones, Green, Botsford and Miller are also in the district, all being worked and all getting out good ore.

Mono.

THE BODIE.—Mono *Relief*, Oct. 1: Have put in a new pump tank on the 600-foot level and have repaired the 200 and 400 tanks, and the 300 bob and bob pit. Are making as good headway as can be expected in repairing breaks on top.

THE STANDARD CON.—Number of men employed in and about the mine, 20.

THE BULWER CON.—For the past week north drift, 200-foot level, was advanced 16 feet. North drift, 360-foot level, was driven 8 feet.

VITALITY IN LUNDY.—Mono *Co. Relief*, Oct. 1: On Wednesday Dr. A. B. O'Connor and G. W. Butterfield arrived in Bodie direct from London, England. They left on Wednesday afternoon for Lundy. Dr. O'Connor represents an English syndicate (in which he himself is a large shareholder).

This syndicate has bought up a group of mines at Lundy and incorporated as the Homer District Consolidated Gold Mining Company. There is ample capital behind the company to do all the legitimate mining the managers may see proper. Dr. O'Connor will at once thoroughly investigate his purchase, and if his prospect proves favorable will immediately proceed to open up and develop the entire group of mines, and work them for all they are worth as a legitimate mining proposition. This company is not prospecting for stock jobs. A fair percentage on the money which they propose to invest is all they ask for, all they hope for, all they expect. Every old practical miner knows that the hills at Lundy are full of mineral, and we incline to the belief that inside of a year the Homer District Con. will be taking it out in very respectable quantities. We suspect that Dr. O'Connor will find that he arrives in Lundy at a bad season of the year to do much real work; but he can so arrange and shape his plans during the fall as to be ready to make things hum when spring opens.

Nevada.

SENECA MINE.—Herald, Oct. 6: This mine is located on the mountain-side just south of the Middle Yuba river and directly north of Badger Hill, being about two miles down the river in a direct line from the now famous Delhi. When the ledge was first discovered some of the loose croppings were crushed and yielded \$2.50 per ton. A tunnel was then run in the hillside to strike the ledge at a depth of 100 feet and a crushing was taken out which yielded \$10 per ton in free gold. The company then descended the mountain-side and run a prospect tunnel 150 feet lower down or at a depth sufficient to give 250 feet of backs to stoop out if found to pay. The lower tunnel reached the ledge a few days ago and is being run on the line of the ledge to determine its extent. The ledge thus far in the lower tunnel is over three feet thick, and the rock shows some free gold. The quartz being taken out in running the drift ahead is being hauled to J. Hustler's one-stamp prospect-mill to be crushed to ascertain its richness. The situation of the mine is most favorable for cheap working. An abundance of water with good fall for pressure is easily obtainable and the extraction of ore can all be done through tunnels, so there is no hoisting required.

COLUMBIA HILL.—North San Juan *Times*, Oct. 5: Geo. Baker and J. A. Jones have been working on the Golconda for the last couple of weeks. At a depth of 20 feet they have struck a 5-foot ledge, which prospects exceedingly well. They are well pleased with their prospect. J. A. Craig is prospecting for gravel near the Eureka Lake Company's sawmill. He has an incline down about 30 feet and expects to strike the gravel within the next 5 or 6 feet. Mr. Craig deserves to strike it rich, as he has done a great deal of prospecting in the last couple of years. The Seneca Co. has a 2-foot ledge, which is said to be rich in free gold; Cherokee has consequently received quite a boom. The El Dorado Co. is still driving their tunnel ahead, but as they have very hard rock it is slow work.

STILL ANOTHER MINE.—Tidings, Oct. 6: Heavy owners in the Pawning mine, which adjoins the Coe, say that if the work is resumed on the last-named property by a good company, they will put machinery on their claim and also resume work. As matters stand at present, the water in the Coe would have to be handled by the Pawning Co.

Placer.

SALE OF THE HATHAWAY MINE.—Placer *Herald*, Oct. 6: James Butts has sold the Hathaway mine, near Ophir, to Valentine Bros. of San Francisco for \$12,000. This is a valuable quartz mine. The vein is about 4 feet thick, and the pay chute is 1000 feet long at the depth of 180 feet. The rock pays from \$10 to \$12 per ton, free milling. The sulphurets average about three per cent. This ledge is supposed to be the monster lode of the Ophir mining district. Valentine Brothers will at once put up hoisting works, and will sink the shaft to the depth of 500 feet. They will also complete a 10-stamp mill. The new managers expect to produce gold bars within 90 days. The mill will be run by water-power. Geo. Horn, the manager of the Valentine mines in this State, will take charge of the mine.

FOREST HILL DIVIDE.—Placer *Herald*, Oct. 6: Very little work is doing at Yankee Jims in the mines. Welker & Kennedy are running drifts in their Georgia Hill mine preparatory to the systematic working of the mine. Charles Trafton is running his tunnel ahead into the same hill, and enlarging it. Georgia Hill has yielded an immense amount of gold, having paid from the grass down to the bedrock. There is no doubt of the existence of a back channel, which will yield a rich harvest whenever it shall be struck by the lucky prospector. At the Gray Eagle mine, Mr. Durning is busy erecting new hoisting works. The shaft is down to bedrock and is over 350 feet in depth, and the old hoisting works are not strong enough to do the work. The Dardanelles is paying richer than ever. The gold is coarse and heavy and plentiful, and is exactly like that in the rich Mayflower channel. The gravel is also of the same character as that of the Mayflower. The mill is running night and day, and works to perfection. All the works are now under roof. The work is going along satisfactorily under the skillful management of Supt. W. H. Grinnel. The mine is dry and well ventilated, and is a very comfortable place for the men to work in. Gen. Hamilton employs about 60 men, and is enjoying a revenue of several hundred dollars a day over and above running expenses. Supt. Chappellet is pushing the work at the Mayflower. The tunnel, on Sept. 30th, was in 5503 feet. At this point they have begun an upraise and will doubtless be in the channel before this item appears in print, as they expect to run 20 feet only. As soon as gravel is struck and drifts are run and other preparatory work is done, a large force of men will be put on, and we can expect to hear of wonderful developments. This mine is the richest on the divide, having yielded \$93,000 in eight months, and when, owing to the difficulty of handling the water, the bedrock was not cleaned or creviced; but now the tunnel will drain the entire mine. At present there are 32 men at work in the hoisting works and tunnel. Twenty-seven men are working at the new mill at the mouth of the tunnel. This mill is a mammoth one, and will contain 20 stamps. It will be worked by steam and water-power. Mr. Chappellet expects to have the mill finished by the 10th of November. At the Live Oak some five men are at work running a drift

from the upraise which connects the tunnel with the upper lead. This upraise begins at a point 1800 feet from the mouth of the tunnel and is 65 feet in length. The drift will connect the Naugatuck ground with the Live Oak. This drift will be 50 feet in length and is in gravel ten feet in thickness. This gravel prospects very well, and is expected to pay well when the ground has been put in proper shape for working. The gold is fine. Supt. Dodge is extending the second upraise in the Baker Divide tunnel, and intends to drift from it in a direction parallel with the course of the tunnel. Mr. Dodge employs ten men. J. C. Scott has men at work on his mine on Volcano canyon. He is preparing to open up his claim there. The Brece & Wheeler claim gives employment to 25 men. The breast is 60 feet in width, but the yield this month is not so large as it was the preceding month.

Plumas.

A RICH STRIKE IN THE DRURY.—Greenville *Bulletin*, Sept. 30: A very rich strike was made in the Drury mine. Mr. Drury has been driving the middle tunnel ahead. On one side of the main lode is a vein of quartz and dirt which is the richest we have ever seen. Out of two pans of dirt and quartz \$30 was obtained by washing merely. As much more is in quartz therefrom.

THE PLUMAS EUREKA MINE continues its operations with the usual regularity and success. John Hosking is superintendent, T. B. Inch, clerk and head accountant, and Wm. F. Johns assayer. There are over 200 men on the pay-roll, most of them from Cornwall. It is the policy of the management to employ only men of sobriety. The greater part of the ore is taken out through the lower tunnel. The 40-stamp mill is one of the best equipped in the country. The corporator has its own assay office, over which Wm. F. Johns presides.

Shasta.

AT OLD DIGGINGS.—Redding *Free Press*: Superintendent Morton of the Josephine and Providence mines at Old Diggings, recently purchased by Walker Bros. of Salt Lake, came up from Greenwood this week with a number of experienced miners and has started the development of these excellent properties in a business-like manner. A 20-stamp mill arrived this week for the Union Consolidated mine. The proprietors, Murray Bros., have also purchased a rock-breaker from Bell Bros.

Sierra.

OXFORD.—Mountain *Messenger*, Oct. 6: The Oxford Mining Co. (Old Gold Hop-) have struck porphyry in their tunnel. It is considered that they are not far from the ledge, as its northern wall, in the tunnel above, was porphyry. A force of men is at work at the Marguerite mine getting the mine in condition to work after its being shut down for several years. The water ditch belonging to the Dutch company has been leased, and a refusal of its purchase for \$5000 has been secured. The Buffalo Quartz Mining Co. of Hog Canyon have, within the past week, completed arrangements for building a new mill on their claim and now have about 20 men at work grading a millsite and doing other preparatory work.

THE BUFFALO.—Sierra *Tribune*, Oct. 6: The owners of the Buffalo mine have concluded arrangements to erect a mill at their mine. Ernest Busch, who has been at San Francisco for the past few weeks, telegraphed up that he had purchased the ten-stamp plant at the Columbo mine, and another telegram was received by those who have in charge the latter property to turn the mill over to the Buffalo Co. Van Slyke's sawmill at Butcher Ranch has already started in to get out the necessary lumber for the mill, boarding-house and blacksmith shop. It is proposed to push the work along with all possible speed so as to have the mill in running order before snow flies. The mine is in splendid condition.

A RICH STRIKE.—In the lower tunnel of the Glidden mine, Gold Valley, this week there was encountered a vein which measures from two to three feet in width, which shows up very rich in free gold. This tunnel is in the hill about 80 feet, and 200 feet in depth from the surface. The Glidden mine promises to become a bonanza to its owners, who are Mat Willoughby, William Jones, O. B. Dolley, and F. L. Glidden. Ed Lawrence and Jack Branden visited the San Luis mine day before yesterday. The tunnel is in 397 feet. The rock is getting softer and the indications are that the ledge is in close proximity. Thos. Murphy is prospecting a quartz ledge above the Chipp mine. The outlook for a mine there is considered quite favorable.

NEVADA.

Washos District.

UNION CON. AND MEXICAN.—Virginia *Enterprise*, Oct. 6: The joint Union and Mexican north drift, started from the Ophir shaft on the 1465 level, has been extended 60 feet; total length, 470 feet.

CON. CAL. & VIRGINIA.—The south drift on the 1435 level is in vein material, giving low assays. The stipes east of the winze on this level continue to look and yield well. On the 1500 level the stipes on the southeast drift yield well. On the 1600 level ore is still being yielded by the stipes south of the Ophir line and 35 feet above the track floor. The stipes on the south drift and winze are showing much good ore. The usual amount of ore has been shipped to the mills and the assays average about as last week.

GOULD & CURRY.—On the 200 level east crosscut from the top upraise from the 300 level (or El Dorado level) has been extended 20 feet; total length, 77 feet. The formation is low-grade ore. The west crosscut started from the top of the same upraise has been advanced 32 feet. The formation is quartz giving low assays.

OCCIDENTAL.—Have completed repairs on the chute in the north incline winze. Extracted 140 tons of ore; shipped to the Atlanta mill 137½ tons. Average assay value, by wagon samples, \$25. Bullion shipped to San Francisco office, total yield from the Atlanta mill for September account, assay value, \$5657.77.

CROWN POINT.—The main south drift on the 700 level is again being pushed ahead. It is passing into ground of a promising appearance. The Suro tunnel drift is making good progress and will be connected in a short time.

BALTIMORE.—Are still operating on the 338 level. The machinery is working well, and there is

no trouble to handle all the water that comes in. The company will soon begin crushing ore at their own mill on the ground.

HALE & NORCROSS.—The drift west from the new 800 station is out 96 feet. The connections made will not only be of great advantage in working the mine, but will materially improve the ventilation.

IMPERIAL GROUP.—The Con. Imperial, Challenge Con. and Confidence mines are still closed down pending the repairs of the hoisting works at the Yellow Jacket shaft, through which they are all worked.

BEST & BELCHER.—On the 300, or El Dorado level, west crosscut No. 1 from the main northwest drift, has been extended 22 feet; total length, 258 feet. The formation is porphyry.

SIERRA NEVADA.—East crosscut No. 3 from the main south drift has been extended 50 feet; total length, 556 feet. It continues in porphyry filled with seams of clay.

ALPHA AND EXCHEQUER.—East crosscut on the 382 level of Exchequer is out 157 feet. The east drift in Alta is out from the old shaft 165 feet.

CHOLLAR.—The drift west from the 350 station has been extended 40 feet; total, 120 feet. The face of the drift is in clay and porphyry.

JUSTICE.—The work at the new mill is progressing well. Are steadily hoisting ore from the different reserves in the mine.

SAVAGE.—A good deal of work has been done on the several levels in the way of repairing and easing up timbers.

SEG. BELCHER.—Work confined to south upraise, where good progress is being made in a favorable formation.

ALTA.—Are engaged in making repairs to the main shaft and to the hoisting-works building.

LADY WASHINGTON.—Are making good headway in the raise above the 725 level.

YELLOW JACKET.—A good deal of repair work of various kinds is in progress.

KEYSTONE.—Good headway is being made in sinking the main incline.

Bristol District.

COPPER FURNACE.—Pioche *Record*, Oct. 6: The Roe Bros.' copper furnace at Bristol has been running for about a day. Fourteen tons of bullion were shipped to Milford last Tuesday. About 16 tons more will be produced, when a stop will be made. The present price of copper makes the business profitable, and we hope the boys will gather in a few thousands of the fortune which Bristol District certainly owes them.

Cottonwood District.

NICKEL.—Cottonwood has had hoisting works erected, and the nickel and cobalt increases in richness as depth is attained.

ALASKA.

ADVANCING.—Free *Press*, Sept. 29: Although Alaska has experienced no great boom this season, the country has nevertheless advanced very rapidly; a number of large mining sales were made, which are the foundations for the near erection of a number of large stamp-mills, and a large amount of development on mining property has been done. The Treadwell mine has been a steady producer, the placer mines in the Basin have yielded well in gold dust, and late reports from the Yukon would indicate that the section will pan out this season in excess of last, not owing to any new discoveries being made, but to the increased number of men that have been mining there. When all reports come in this fall from both the Yukon and Copper river regions and from Cook's inlet, we confidently expect to hear of a number of rich discoveries as the result of the past season's prospecting.

COAL.—Although a number of men have devoted this summer to prospecting for coal in this near vicinity, nothing has yet been struck. Prospectors should bear in mind that around here the formation is not coal bearing. There is a sandstone belt to the north and one to the south, in which good coal veins might be found.

RICH ORE.—Andy Anderson now has a ton of \$500 ore packed down from the mine to his camp on Sheep creek, and siwashers are now packing it down to the beach; it will be shipped below on the Ancon. Andy, working alone, takes out about 125 pounds ore daily, making two trips daily packing it down to camp. Specimens of ore from this vein will run 2000 ounces silver and from \$50 to \$200 in gold per ton.

ARIZONA.

WALKER DISTRICT.—Prescott *Courier*, Oct. 1: J. N. Rodenburg has come in from Walker district. From him we get the following items: He has built a house and is going to put men at work in his Berlin mine. N. L. Griffin and Fred Sable are sacking ore from the Fortune mine. Frank Kuhne will shortly ship two carloads of ore from the Belle mine. The Amulet is yielding lots of rich ore. John King is getting ore that will work \$800 to the ton. Mike Chandler is making from \$4 to \$5 a day in his placer claim. The district will poll about 60 votes. Harlan & Barrington, owners of the Howard mine, were at the Bank of Arizona Saturday last with over 400 ounces of gold product of five tons of rock. The "bar" is worth nearly \$7000. Water is increasing and they will soon run the mill ten hours each day. G. K. W. McNary has just located two very rich ledges in Copper basin. Ore is rich in silver. Walter Murphy of Jerome says two cars a day of silver-copper bullion are being shipped East. Van Name's mill is crushing rich rock. N. L. Griffin, a pioneer miner of Walker district, has brought in a shipment of ore. A. J. Park says miners are prosperous in Hassayampa district. John Dawson and John Taylor have finished assessment work on the Gray Eagle, Bradshaw district. E. L. Gobin, miner and millman, says times are improving in Peck district.

THE WATERVALE.—Tombstone *Epiphany*, Oct. 1: From Superintendent Coffman, of the Watervale Mining Co., it is learned that the double compartment shaft, now being sunk in the Bunker Hill, is down 335 feet. Three shafts are running and work never ceases. The large double engine, now in construction in Chicago, will be finished and shipped

about the middle of October. Shipping receipts have been received by Mr. Coffman for 20 tons of material now on the way, including boilers, ore-cars and other machinery. The capacity of the new hoist is not exactly known, but it is sufficient for a depth far below the water level. The Rattlesnake, Mammoth, Bunker Hill and other properties of the Watervale Co. are rapidly developing under the able management of Mr. Coffman into bonanzas.

MORAVE, — Miner, Oct. 6: There are 60 tons of ore from the C. O. D. on the ore platform at the sampling works ready for working. The Lone Star, at Mineral Park, is producing better ore than ever before. The ore streak is six inches wide, but very rich. It is rumored that a ten-stamp mill will soon be erected on Stockton Hill, and that Prescott parties are interested in the matter. Supt. Campbell of the Flores brought in Tuesday a bar of bullion valued at \$1500. The recent strikes in the Flores are developing finely, and the ledge is widening and increasing in richness. E. F. Thompson this week sold the Vanderbilt mine at Cerbat to a Philadelphia syndicate for \$10,000. Since the first of the year two miners have taken about \$7000 out of this mine, and it is considered one of the best properties at Cerbat.

AROUND PRESCOTT, — Journal-Miner, Oct. 6: Col. Bigelow has six tons of ore on the dump ready for shipment, and expects to complete a load this week. Work is being pushed on the smelter for the Copper Basin Copper Co. Work will be commenced again soon on the Perry mine, a property which has yielded several thousand dollars in gold ore. The United Verde Copper Co., a few days since, started up another 30-ton smelter, having two in operation now. Nearly two carloads of ore arrived at the sampling works yesterday from Congress mine, and the above institution is crowded at present. Charles A. Girdler and Dr. Vickers have been experimenting to-day with the treatment of sulphurets ore from the Congress mine, by means of electricity. Walter Wright continues to run the Del Pasco mill with good success as water can be obtained. He has an abundance of ore, but water is scarce. Freighters are engaged in moving a smelter to the Hillside mine, and the owners of that property expect to commence smelting their ores soon at the mine. The Crowned King continue to run their pack train getting ore to the mill, so as to be ready for a continued run when the water becomes plentiful, which is at present very scarce. A deed has been filed for record from John Lawler and Jules Baumann, for the Lawrence and Manzanita mining claims, Agua Fria district, the price named being \$10,000. Geo. W. Sines returned yesterday from a trip through the Hassayampa mining district. He says the new shaft in the Senator is down to a depth of 100 feet, and is in good ore at the bottom. Messrs. Harlan and Barrington, of the Howard mine, brought in another bar of gold bullion to-day, weighing 402 ounces, a total value of \$6834. This bar was the result of a run of five tons of ore from the mine. The property is not yet opened up to any great extent, but has yielded some \$20,000 or \$30,000, and has several hundred tons of ore in sight. J. M. W. Moore, of the Prescott sampling works, reports the largest receipts of ore yesterday, at those works, of any single day since they were started, amounting to over 40,000 pounds, or more than two carloads. Of this, 23,000 pounds were from the Congress, the remainder being from Lynx creek and Hassayampa districts. Captain A. T. Brann has just returned from a trip through the Bradshaw country, and reports the greatest activity there. W. B. Long, superintendent of the Ora Bella, has about 75 men employed in the mines and building roads.

COLORADO.

LEADVILLE NEWS, — Denver Tribune-Republican, Oct. 6: The Castle View mine on Carbonate hill was leased a few weeks ago by the Castle View Mining Co. to Captain Eben Smith. To open and drain the property a long shaft is being driven from the Henriette and Maid workings through the Big Chief to the Castle View. When drained, the Castle View will be worked through its own shaft. This is one of the most important enterprises in progress in Leadville at the present time, as it will make two more producing mines. The Big Chief, which has ore but has been much troubled by water, will commence shipping, and likewise the Castle View. The latter mine has been idle for some months on account of trouble in the company. The body of pyrite ore which was discovered some weeks ago in the Moyer, by a drift in the ore chute east of the shaft, is proving to be a very fair channel of good ore in the midst of the great body of low-grade sulphide ore. The Colonel Sellers mine is doing as well as usual, and in September will make its regular monthly output of about \$50,000. The Glass-Pendery has started work again with its new plant of machinery. The shaft is being sunk at the rate of from 3 to 4 feet per day. Mr. H. B. Slater has returned from an extended business and pleasure trip through the East. While in Washington he secured the patents for his new process of treating bluish silver ores. Experiments with the process are now being made in Denver. If these experiments are successful, as they are likely to be, it is more than probable that a plant of 200 tons per day capacity will be erected in Leadville by the Iron Silver Co. for the purpose of treating the low-grade sulphide ore of the Moyer mine before the winter sets in. Some ore was struck unexpectedly in the Virginus on Wednesday. A raise is being made through the flint to open a new stop in the body of iron ore overlying. In the flint the raise cut a body of lead carbonate ore two feet thick. The ore was of excellent grade, assaying 55 per cent lead and about 40 ounces silver.

IDAHO.

SHEEP MOUNTAIN, — Ketchum Keystone, Oct. 1: Numerous parties have of late arrived in Ketchum from the Sheep Mountain and Seaford districts for the purpose of marketing ores, shipping in fall supplies, etc., and nothing but the very best of reports reach us in regard to the outlook in that country. It is a fact beyond doubt that a number of mines there have large quantities of rich ore on the dump which is held simply in anticipation of better freight and reduction facilities. The mine-owners there unite in the statement that there is sufficient ore of desirable character in sight to warrant the establishment of smelters of moderate capacity, which, it is

the universal opinion, could hardly fail of success in the treatment of custom ores. The reported richness of mines in that region is corroborated by every miner who has been there. Most of the miners will, however, come out for the winter season, and we learn the store and bar in the camp of Seaford have already been closed.

THE TISHMINGLE, owned by Mr. Harland, is one of the richest locations in the district. It is developed by several cuts on the ledge and one tunnel 22 feet in length, in which the ore is in place and continuous, showing several feet of very high-grade ore, and about ten inches that will assay in the neighborhood of 1000 ounces. There is a vast amount of ore in that country that is deceiving in character, much of which may prove to be very valuable. The formation is granite and lime with an occasional porphyry dyke. The ores are chiefly "dry," carrying less than 20 per cent lead, traces of gold and large quantities of silver.

PLACER DIGGINGS, — Kee Levah, a well-known China laundryman of this place, returned from Smoky a few days since with 15 ounces of gold dust, the result of four Chinamen's work for 30 days on a new prospect in that district. The ground is extensive and easily worked, the bedrock being but seven feet from the surface, but the ground thus far has not produced over \$2 a day to the man.

YREKA DISTRICT, — Wardner News, Sept. 29: The owners of the Emma and Last Chance mines have every reason to feel proud of the development of their property. The Last Chance is proving a veritable bonanza, and when the same amount of work has been done on the Emma, similar results may be expected. The Spokane Company's concentrator at the foot of the mountain is now in thorough working order and is kept running uninterruptedly.

ELK CREEK, — O. A. Brown, the original discoverer of the Elk creek gold mines, sold on Thursday all his interest in that property to Messrs. J. F. Wardner and B. Goldsmith.

LALANDE DISTRICT, — Nothing new can be said about the Poorman mine at Burke beyond the fact that increased development but adds additional proof of the vast resources of the property, and the new concentrator is working to a claim. Supt. Clark says: Out of 100 to 120 tons of second-class ore, it produces 25 to 30 tons concentrates, which assay 65 per cent lead and 40 ounces silver.

DIAMOND HITCH, — Supt. B. B. Jones is more than pleased with the result of his labor on the Diamond Hitch mine. During the week the property was visited by Prof. Price of San Francisco, who expressed himself in unqualified praise of the good showing made in the mine, and says he has every confidence in its becoming a great ore-producer.

EAGLE DISTRICT, — The ditch being built by Syd Mills to convey water from East Eagle creek to Fancy gulch is nearing completion, four miles of the work being now finished.

CEUR D'ALENE DISTRICT, — The owners of the Mother lode made a rich strike last week in their middle tunnel by exposing a body of ore from 3 to 4 feet in width, bearing plenty of free gold. The tunnel is in 160 feet and development work continues day and night. Scarcity of water compels the necessity of working the arastra only occasionally.

MONTANA.

GERMAN GULCH, — Inter-Mountain, Oct. 1: Dr. G. W. Beal came in from his placer mine in German gulch to-day and speaks in glowing terms of the favorable outlook for the new camp at the junction of German and Blacktail gulches. He reports some valuable lead discoveries being made there and a great deal of work in progress. The Anaconda Co. purchased a half interest in Thomas Newcomb's properties last week, from the good showing made in the Newcomb lode, which is down 40 feet.

THE LOWLANDS, — Inter-Mountain, Oct. 1: At the Butte City Sampling Works there was received on Wednesday a quantity of ore from the Amazon mine, in the Lowlands, which was assayed, and the result was \$490 in silver and 20 ounces in gold. This is about the richest quartz that has ever been brought to Butte, and the owners say that they have plenty of it in the Amazon mine.

THE RUBY MINE, — It was reported on the streets yesterday that another pocket of wonderful richness has been discovered in the Ruby mine, in the same district. Since the Anaconda Co. left the mine the owners have been at work and opened up this new find. It is said that the gold runs like wire through the rock and by breaking a piece of ore the yellow metal hangs together in threads. The proprietors of the Ruby express themselves as pleased that the Anaconda Co. did not take up the bond of \$200,000 on the mine.

CASTLE MOUNTAIN MINES, — Butte Inter-Mountain, Oct. 1: The great strike of the season has just been made by Ben Johnson and John Davis at the head of Thompson's gulch, about 15 miles west of White Sulphur Springs. This consists of a six-foot vein of gold ore that yields two or three cents per pound in both the lead matter and the regular ore from wall to wall. Mr. Johnson is of the opinion the ground will also pay for working for placer gold. This lead is believed to be the source from which the rich deposits of Thompson gulch came. There has been a big strike made recently in the Grasshopper lead, situated about six miles east of town. The rich body of ore was found about two weeks since, but the matter has been kept dark. The find consists of a four-foot vein of solid ore that runs in the hundreds. About six inches of this is very rich and assays 2000 ounces in silver. Several undeveloped properties in the vicinity of the Alice and Judge mines have recently been sold to capitalists. Such prospects rate at about \$500 each.

THE ALICE MINE, — The ore from the Alice mine is worth \$170 in silver and lead. It costs \$75 per ton to haul it to Toston, \$35 to treat besides, or 10 per cent, leaving a net income of \$40 per ton for mining. The mine is now developed to a depth of 100 feet, and a force of men has been set to work stopping. It is estimated that it will require three months to take out the ore in sight.

DEWEY'S FLAT, — Inter-Mountain, Oct. 2: The most profitable mine now in operation in this vicinity is the Lone Pine, owned and operated by the Partridge Bros. Their plant is on the Big Hole riv-

er, two miles below Dewey's Flat. Their power is a turbine wheel. The mine is on Quartz hill nearly 10 miles from their mill. During the first years of their ownership the mine did not prove very profitable. Only fair wages were made and nothing more. But for the last two seasons it has been improving very rapidly, running up from less than 20 ounces to an average of nearly 60 ounces per ton. During this time they have followed the ledge down some 300 feet. The Partridge Bros. are the only ones who have made a success of the Jones pulverizer of Portland, Or. They seem to experience no difficulty in regularly crushing about five tons when they have water to run all day. They amalgamate by the barrel process and save up to a high percentage that way. Allen Hay is steadily running his little mill at the Flat and is crushing ore from the old Quartz hill mine. This property is also improving in size and value as they attain depth, and from present appearances would amply repay the erection of a large mill. Quite a large amount of prospecting is now going on between Quartz hill and the Vipond district. About 20 men are engaged on different locations there.

PHILLIPSBURG DISTRICT, — Butte Miner, Sept. 29: H. K. Fairgrieve of Phillipsburg, M. T., reports the burg to be exceedingly active. Both the Granite and Bi-metallic mills are pushing their building operations. Superintendent Risque of the Bi-Metallic Co. has his company's mill on Douglas creek almost under cover. Much of the machinery is on the ground. Their mine is in most excellent condition, with enough ore on the dump to keep the new 50 stamps in constant operation for months.

SAN FRANCISCO, — Superintendent Eugene Smith reports this mine in most favorable condition. The east 400 is looking exceedingly well. This company has purchased a millsite just west of town and expects to break ground for reduction works early in the coming season.

THE PEARL MINE is looking phenomenally fine, and it looks as if this property in the near future would be a very valuable one and a producer of high-grade ore.

THE SYDNEY, under the management of Supt. Gable, is progressing in good shape.

THE GRANITE looks as well as of old and is still the whale of producers.

THE HOPE Co. is as usual pounding away with all their stamps. The superintendent is sanguine of the Silver Chief turning out a rich producer. The company are the pioneers of silver mining in Montana and who erected the first silver-mill in the Territory 20 years since.

DUNKLEBERG DISTRICT, — Reports from Dunkleberg are very encouraging for the future of the carbonate camp. The properties of Drs. Mitchell and Mussigbrod are regular producers and shippers of good grade ore. Dr. Mitchell is most sanguine in regard to what he hopes to be a second Leadville. The Hatta Co. at Dunkleberg is in active operation and developments being pushed.

NEW MEXICO.

ORGAN, — Rio Grande Republican, Sept. 29: Stubenrauch and Cowan will soon make a shipment from the Gray Eagle. Hayden, Davis and Robinson, who have a lease on the Modoc, have opened a cave which is said to be lined with mineral. The Modoc has an immense body of heavy galena ore, which runs well in silver. McCall is working a lease on the Little Buck. He is following a streak of ore in the line which bids fair to open out into a body of high-grade ore, such as has made several leasers a good stake on the same property. Geo. Browne, who is a competent miner, has lately visited the camps of Hermosa, Tierra Blanca and Kingston. He returns satisfied that Organ has the best prospects for a permanent, paying camp that there is in the Territory. Prof. J. C. Carrera has again taken a lease on the Bennett mine. Clark & Brown have run a crosscut on the Ben Nevis, which is in 85 feet. The ledge at this point is 50 feet wide, of a concentrating ore, with rich streaks of smelting ore in several places. The Ben Nevis is one of the most promising properties now developed in the Organs.

PIÑOS ALTOS, — Southwest Sentinel, Oct. 6: Work in an energetic and practical manner is soon to be resumed on the Gold and Silver Ribbon claims located immediately west of and adjoining the Mina Grande, one of the clearest cut fissure veins in the Pinos Altos range. The Osceola, the northernmost extension of the famous Atlantic and Deep Down properties, makes a fine showing at 50 feet in depth. The crevice maintains its usual width, ranging from 6 to 15 inches of milling ore. The Thunderbolt, at 50 feet in depth, is proving to be just what the surface indications promised, namely, the making of a good mine. The Maggie B., on the Atlantic trail, is a new opening of one of the old prospects of the camp. The present owners, Messrs. Bagsby, Ashton & Harkins, are pushing work with commendable zeal.

GEORGETOWN, — Thos. B. Pehy has purchased of Geo. O. Smith the Commercial mine for \$10,000 and the Scottish for \$15,000. The Mimbres Mining Co.'s property at Georgetown, which includes the Naiaid Queen, Glamorgan and several other silver-producing mines and a valuable stamp-mill, was sold at public auction on Saturday under a decree foreclosing a mortgage to Geo. Bliss, Thos. F. Mason and J. D. Hague of New York, for \$51,352.20. Mr. Thos. B. Pehy, who has had charge of this property for four years, will continue to manage it.

COOK'S PEAK, — Thirty men are employed on the Graphic mine at Cook's Peak by Messrs. Hadley & Co. As development progresses the ore increases in value, and it goes without saying that this noted property bids fair to rival some of the famous carbonate mining estates of Leadville.

OREGON.

RICH STRIKES, — Bedrock Democrat, Oct. 6: Word comes from Cable Cove of recent discoveries in quartz made by Don Wickelizer and Wm. Reilly, the richness of which is simply wonderful. A well-defined vein of gold quartz has been uncovered which shows gold in large quantities to the naked eye. The discoverers are recently from Nevada.

THE OUTLOOK, — The outlook of the mines of Cracker creek and of the country adjacent becomes brighter day by day. The mines upon which extensive development work is being done are showing up

in a manner that is truly encouraging, and new discoveries are being made almost daily. New properties that have only until recently been put to the test are coming to the front in a manner that indicates that the wealth of that part of Baker county is just becoming known.

THE GRAY EAGLE, — J. C. Young, one of the owners of the Gray Eagle mine at Cracker creek, came into town Monday evening and brought with him a large quantity of the finest galena and sulphuret ore ever seen in this city. The samples are taken direct from the breast of the tunnel, the ledge being about four feet in width.

CLOSED BY ATTACHMENT, — The Portland Reduction Works have been closed by attachment for several days past. It is thought that the company will soon be reorganized, and if this occurs a much larger plant will be purchased. If the Portland Reduction Works conclude to stand still it is said that a wealthy syndicate stands ready to erect reduction works of sufficient capacity to reduce all the ores that may be sent to that city.

PREPARING FOR WINTER, — Numerous mine-owners of Baker county have visited Baker City the past week to purchase the necessary supplies to carry on work at their properties all winter. From present indications they are a determined set of fellows, and by the coming of another spring enough development work will have been done on many locations to place them on a basis for future extensive operations.

UTAH.

ALTA, — Salt Lake Tribune, Oct. 6: A prominent mining man who visited Alta a few days ago says he was surprised at the favorable outlook there. He found 150 men at work about the various mines. The New Emma, Flagstaff, Windsor group, Buckland Tunnel, Toledo, Emily, Superior, Buffalo Tunnel, City Rocks, Prince of Wales, Revolution, Rough and Ready, and some others are active and some are showing well. The Prince of Wales was spoken of as doing well in the hands of leasers. He says the camp certainly has a good future.

THE SALE OF THE BROOKLYN, — The Tribune has already noticed the sale of the Brooklyn group of mines to the Lead Mining Co., but its importance was not fully shown up. The Brooklyn is one of the best developed mines in Utah, and has paid in dividends over \$200,000, the entire production of metal being over \$1,500,000. It is estimated that the ore on the dump and blocked out in the mine will produce over a quarter of a million more. The Brooklyn lies on the opposite side of a ridge to the Lead group, and over 200 feet higher. This will enable the company to connect the two groups by a tunnel about 1800 feet long. Thus connected, the tramway will be run into the Brooklyn so as to give easy and cheap transit for ore to mill and railway. Surveys for this tunnel are now being made.

CINNABAR, — Utah Union, Oct. 6: The Southern Utah cinabar deposits are showing up well and attracting the attention of mining men.

COPPER, — On Sunday morning a complete copper smelter arrived in Frisco over the Utah Central railway and is being freighted across the San Francisco range of mountains to Copper Gulch, four miles from Frisco. It will there be erected and, it is hoped, will prove a profitable investment to the French syndicate now operating the Comet mine. This property is reported as making a splendid showing of ore in the development work now going on, and the outlook for Frisco is much brighter than it has been for a long time.

WASHINGTON.

WANNACUT LAKE DISTRICT, — Spokane Falls Herald, Sept. 30: W. H. Townsend returned last week from Wannacut lake, where he has been doing the assessment work on the Triune, Jessie, Occident, San Francisco and Silent Friend lodes. They sunk a 20-foot incline shaft on the Jessie and have a three-foot vein of ore carrying chloride of lead, free gold and some silver. On the Triune the shaft will be sunk 100 feet this winter and a crosscut run from the bottom so as to determine the width of the vein. Chas. H. Schepster was the first to discover gold in the Wannacut Lake district. He first went in there in August, 1887, but could not remain long on account of the lack of supplies. He returned to Condonally for the winter and went back in February of this year. During the past summer considerable prospecting has been done and locations made. Next year the assessment work will have to be done on all the claims, when it is expected that many will show up well that are now unknown. Three companies have been organized to work in this district. One with a capital stock of \$500,000 has secured the Magebee, New Hope and Melvina lodes. Another with \$250,000 will develop the Powderly claim. Hall & Dunham have organized a company with offices at La Canas and Portland, called the Wannacut Lake & Aetna Co., with \$50,000 capital stock. They have 12 claims. A three-stamp prospecting mill is now on its way to the district. It will be necessary to place the large mills on the Similkie river, four miles from the mines, so as to secure an abundant water supply.

GOLD DISCOVERY, — Spokane Falls Herald, Sept. 30: A Herald representative learned on last Friday night that what bids fair to be an important gold discovery was made on Old Baldy mountain, several miles northeast of the city. Without making a special visit to the scene of the alleged discovery, it is impossible at this time to tell the extent and value of the find. It appears that Mr. Causey, who is interested in a milk ranch near the fair grounds, was out hunting some time since; while on the southeast side of the mountain named, he and his companion found strong indications of gold-bearing lodes. They returned to the city and provided themselves with the necessary tools, went back to the scene of the find and put in a blast in a favorable-looking spot. This shot threw out quite a quantity of quartz showing free gold. The discovery was kept secret for the time being and friends of the discoverers notified. The result is at present there are 20 claims located in the vicinity of the first discovery. No development work of any consequence has yet been done, so it is impossible to state with any degree of accuracy what the claims will amount to. Mr. Causey states that there is gold in the creek bottom near these leads and that he is of the opinion that placers exist there that will pay well for working.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador Ledger, Oct. 6: Drifting in the Wildman mine has been delayed on account of a portion of the shaft needing repairs, which they have been doing the last week. At the Lincoln a drift is to be run from the foot of the hill near the old shaft formerly worked by R. C. Downs. There is a raise of about 100 feet, and if they can strike the ledge at that depth it will give work perhaps for years. H. C. Callahan is up from San Francisco looking after matters pertaining to the Sutter Creek mine. There is a proposition on foot to connect their mill pipe with the Mahoney pipe, which will furnish them with water the year round. They have a very good ledge in sight. The Leggett and Mandich claim, about six miles above here, was sold last week principally to S. D. R. Stewart. The price to be paid is \$10,000. There is to be a ten-stamp mill put upon the claim right away.

AMADOR GOLD MINE.—Ledger, Oct. 6: Preparations for the building of the 60-stamp mill at this mine are making satisfactory headway. F. Mason has secured the contract for building the retaining wall, and is now busy at work on the same. This wall when completed will be 107 feet long, 3 feet thick and 12 feet high. When this wall is finished the work of putting the mill together will be inaugurated. They commenced on the battery-blocks last week. It is expected to have the mill in running order about Christmas. At present there are 30 men employed at the mill and 25 at the mine, besides four teams.

MISCELLANEOUS.—The Gillick mine is still working with promising prospects. Another effort is being made to bond the Doyle mine in Hunt's gulch in the interest of English capitalists.

DRY TOWN.—Cor. Amador Dispatch, Oct. 6: The Overplus mine at Quartz Mountain has resumed work again. Mr. Goodman, the owner, is putting up a five-foot Huntington mill, and will move the Frue concentrators from the Quartz Mountain mill to the Overplus. The ore will pay \$6 to \$8 per ton free gold, and about three-fourths per cent in sulphurets which are worth \$500 to \$600 per ton. The Cosmopolitan is down 500 feet; they will soon sink a shaft; then drifting will be in order about the first of November. The Gover Co. broke ground on its new reservoir on Monday; they will push it with all possible speed so as to get the pipe laid before the rain. In all probability the mine and mill will be run by water from Quartz Mountain by January 1st. The mill is kept running steady of late.

Calaveras.

ACTIVE.—Calaveras Chronicle, Oct. 6: The mining industry is quite active. The Blazing Star has started again and will soon commence to take out ore. The newly-erected 10-stamp mill at the Cook mine commenced crushing rock on the first of the month, but owing to the scarcity of water five stamps only were started. Mr. Schee is the present owner.

WATER SCARCE.—Angels Echo, Oct. 6: The scarcity of water in our section rather retards milling progress to some extent.

GOLDEN EAGLE.—The Golden Eagle mine, situated near Albany Flat, and owned by Messrs. Gerkins and Swartz, is showing up splendidly. Two shafts have been sunk, one to the depth of 40 feet, the other 25 feet. A large vein 12 feet in width shows up well.

El Dorado.

DRIFTING.—Georgetown Gazette, Oct. 4: J. J. Busick of the McCall mine at Gray Eagle Bar, was in town to-day. There are 15 men engaged in drifting.

Los Angeles.

COAL AND IRON.—Newhall Times, Oct. 6: We met Colonel Brophy Saturday, who gave us a few notes on what has been discovered on his ranch about two miles southwest from Newhall. About 14 years ago outcroppings of coal were found, but the lead was not opened up until recently. There were three well-defined veins of coal of 5, 7 and 4 feet thick, and the coal that has been taken out is of a very superior quality. It mines easily, and is of a superior quality, burning to a yellow ash, without any clinkers. The colonel has also discovered five leads of magnetic iron running from 15 to 30 feet thick, and which goes 50 per cent iron. There are two different parties of capitalists who have made overtures to purchase the mine, and it is very probable that it will be sold within a short time.

A GOOD REGION.—Ed. Lyon came down from Ravens Wednesday and brought quite a number of specimens of quartz to be assayed. He says there is quite a mineral region about ten miles southeast of South Side station. He has two claims of gold-bearing rock, one with a well-defined ledge of 6 to 9 feet, and which goes \$20 to \$30 per ton; the rock is free-milling gold, with good traces of silver. It is so easily worked that \$3-ore would pay well. There is plenty of wood and water on the claims, and the cost for working could be figured down to the minimum point. He has a tunnel in 20 feet and a shaft 16 feet, and the ore improves as he gets into it. His other claim has a ledge with an average of two feet and which goes from \$27 to \$30 per ton. Claims of Jones, Green, Botsford and Miller are also in the district, all being worked and all getting out good ore.

Mono.

THE BODIE.—Mono Relief, Oct. 1: Have put in a new pump tank on the 600-foot level and have repaired the 200 and 400 tanks, and the 300 bob and bob pit. Are making as good headway as can be expected in repairing breaks on top.

THE STANDARD CON.—Number of men employed in and about the mine, 20.

THE BULWER CON.—For the past week north drift, 200-foot level, was advanced 16 feet. North drift, 360-foot level, was driven 8 feet.

VITALITY IN LUNDY.—Mono Co. Relief, Oct. 1: On Wednesday Dr. A. B. O'Connor and G. W. Butterfield arrived in Bodie direct from London, England. They left on Wednesday afternoon for Lundy. Dr. O'Connor represents an English syndicate (in which he himself is a large shareholder).

This syndicate has bought up a group of mines at Lundy and incorporated as the Homer District Consolidated Gold Mining Company. There is ample capital behind the company to do all the legitimate mining the managers may see proper. Dr. O'Connor will at once thoroughly investigate his purchase, and if his prospect proves favorable will immediately proceed to open up and develop the entire group of mines, and work them for all they are worth as a legitimate mining proposition. This company is not prospecting for stock jobs. A fair percentage on the money which they propose to invest is all they ask for, all they hope for, all they expect. Every old practical miner knows that the hills at Lundy are full of mineral, and we incline to the belief that inside of a year the Homer District Con. will be taking it out in very respectable quantities. We suspect that Dr. O'Connor will find that he arrives in Lundy at a bad season of the year to do much real work; but he can so arrange and shape his plans during the fall as to be ready to make things hum when spring opens.

Nevada.

SENECA MINE.—Herald, Oct. 6: This mine is located on the mountain-side just south of the Middle Yuba river and directly north of Badger Hill, being about two miles down the river in a direct line from the now famous Delhi. When the ledge was first discovered some of the loose croppings were crushed and yielded \$2.50 per ton. A tunnel was then run in the hillside to strike the ledge at a depth of 100 feet and a crushing was taken out which yielded \$10 per ton in free gold. The company then descended the mountain-side and run a prospect tunnel 150 feet lower down or at a depth sufficient to give 250 feet of backs to stoop out if found to pay. The lower tunnel reached the ledge a few days ago and is being run on the line of the ledge to determine its extent. The ledge thus far in the lower tunnel is over three feet thick, and the rock shows some free gold. The quartz being taken out in running the drift ahead is being hauled to J. Hustler's one-stamp prospect-mill to be crushed to ascertain its richness. The situation of the mine is most favorable for cheap working. An abundance of water with good fall for pressure is easily obtainable and the extraction of ore can all be done through tunnels, so there is no hoisting required.

COLUMBIA HILL.—North San Juan Times, Oct. 5: Geo. Baker and J. A. Jones have been working on the Golconda for the last couple of weeks. At a depth of 20 feet they have struck a 5-foot ledge, which prospects exceedingly well. They are well pleased with their prospect. J. A. Craig is prospecting for gravel near the Eureka Lake Company's sawmill. He has an incline down about 30 feet and expects to strike the gravel within the next 5 or 6 feet. Mr. Craig deserves to strike it rich, as he has done a great deal of prospecting in the last couple of years. The Seneca Co. has a 2-foot ledge, which is said to be rich in free gold; Cherokee has consequently received quite a boom. The El Dorado Co. is still driving their tunnel ahead, but as they have very hard rock it is slow work.

STILL ANOTHER MINE.—Tidings, Oct. 6: Heavy owners in the Powning mine, which adjoins the Coe, say that if the work is resumed on the last-named property by a good company, they will put machinery on their claim and also resume work. As matters stand at present, the water in the Coe would have to be handled by the Powning Co.

Placer.

SALE OF THE HATHAWAY MINE.—Placer Herald, Oct. 6: James Butts has sold the Hathaway mine, near Ophir, to Valentine Bros. of San Francisco for \$12,000. This is a valuable quartz mine. The vein is about 4 feet thick, and the pay chute is 1000 feet long at the depth of 180 feet. The rock pays from \$10 to \$12 per ton, free milling. The sulphurets average about three per cent. This ledge is supposed to be the monster lode of the Ophir mining district. Valentine Brothers will at once put up hoisting works, and will sink the shaft to the depth of 500 feet. They will also complete a 10-stamp mill. The new managers expect to produce gold bars within 90 days. The mill will be run by water-power. Geo. Horn, the manager of the Valentine mines in this State, will take charge of the mine.

FOREST HILL DIVIDE.—Placer Herald, Oct. 6: Very little work is doing at Yankee Jims in the mines. Welker & Kennedy are running drifts in their Georgia Hill mine preparatory to the systematic working of the mine. Charles Trafton is running his tunnel ahead into the same hill, and enlarging it. Georgia Hill has yielded an immense amount of gold, having paid from the grass down to the bedrock. There is no doubt of the existence of a back channel, which will yield a rich harvest whenever it shall be struck by the lucky prospector. At the Gray Eagle mine, Mr. Durning is busy erecting new hoisting works. The shaft is down to bedrock and is over 350 feet in depth, and the old hoisting works are not strong enough to do the work. The Dardanelles is paying richer than ever. The gold is coarse and heavy and plentiful, and is exactly like that in the rich Mayflower channel. The gravel is also of the same character as that of the Mayflower. The mill is running night and day, and works to perfection. All the works are now under roof. The work is going along satisfactorily under the skillful management of Supt. W. H. Grinnel. The mine is dry and well ventilated, and is a very comfortable place for the men to work in. Gen. Hamilton employs about 60 men, and is enjoying a revenue of several hundred dollars a day over and above running expenses. Supt. Chappellet is pushing the work at the Mayflower. The tunnel, on Sept. 30th, was in 5503 feet. At this point they have begun an upraise and will doubtless be in the channel before this item appears in print, as they expect to run 20 feet only. As soon as gravel is struck and drifts are run and other preparatory work is done, a large force of men will be put on, and we can expect to hear of wonderful developments. This mine is the richest on the divide, having yielded \$193,000 in eight months, and when, owing to the difficulty of handling the water, the bedrock was not cleaned or creviced; but now the tunnel will drain the entire mine. At present there are 32 men at work in the hoisting works and tunnel. Twenty-seven men are working at the new mill at the mouth of the tunnel. This mill is a mammoth one, and will contain 20 stamps. It will be worked by steam and water-power. Mr. Chappellet expects to have the mill finished by the 10th of November. At the Live Oak some five men are at work running a drift

from the upraise which connects the tunnel with the upper lead. This upraise begins at a point 1800 feet from the mouth of the tunnel and is 65 feet in length. The drift will connect the Nauatauck ground with the Live Oak. This drift will be 50 feet in length and is in gravel ten feet in thickness. This gravel prospects very well, and is expected to pay well when the ground has been put in proper shape for working. The gold is fine. Supt. Dodge is extending the second upraise in the Baker District tunnel, and intends to drift from it in a direction parallel with the course of the tunnel. Mr. Dodge employs ten men. J. C. Scott has men at work on his mine on Volcano canyon. He is preparing to open up his claim there. The Breese & Wheeler claim gives employment to 25 men. The breast is 60 feet in width, but the yield this month is not so large as it was the preceding month.

Plumas.

A RICH STRIKE IN THE DRURY.—Greenville Bulletin, Sept. 30: A very rich strike was made in the Drury mine. Mr. Drury has been driving the middle tunnel ahead. On one side of the main lode is a vein of quartz and dirt which is the richest we have ever seen. Out of two pans of dirt and quartz \$30 was obtained by washing merely. As much more is in quartz therefrom.

THE PLUMAS EUREKA MINE continues its operations with the usual regularity and success. John Hosking is superintendent, T. B. Inch, clerk and head accountant, and Wm. F. Johns assayer. There are over 200 men on the pay roll, most of them from Cornwall. It is the policy of the management to employ only men of sobriety. The greater part of the ore is taken out through the lower tunnel. The 40-stamp mill is one of the best equipped in the country. The corporation has its own assay office, over which Wm. F. Johns presides.

Shasta.

AT OLD DIGGINGS.—Redding Free Press: Superintendent Morton of the Josephine and Providence mines at Old Diggings, recently purchased by Walker Bros. of Salt Lake, came up from Greenwood this week with a number of experienced miners and has started the development of these excellent properties in a business-like manner. A 20-stamp mill arrived this week for the Union Consolidated mine. The proprietors, Murray Bros., have also purchased a rock-breaker from Bell Bros.

Sierra.

OXFORD.—Mountain Messenger, Oct. 6: The Oxford Mining Co. (Old Gold Hop-) have struck porphyry in their tunnel. It is considered that they are not far from the ledge, as its northern wall, in the tunnel above, was porphyry. A force of men is at work at the Marguerite mine getting the mine in condition to work after its being shut down for several years. The water ditch belonging to the Dutch company has been leased, and a refusal of its purchase for \$5000 has been secured. The Buffalo Quartz Mining Co. of Hog Canyon have, within the past week, completed arrangements for building a new mill on their claim and now have about 20 men at work grading a millsite and doing other preparatory work.

THE BUFFALO.—Sierra Tribune, Oct. 6: The owners of the Buffalo mine have concluded arrangements to erect a mill at their mine. Ernest Busch, who has been at San Francisco for the past few weeks, telegraphed up that he had purchased the ten-stamp plant at the Columbo mine, and another telegram was received by those who have in charge the latter property to turn the mill over to the Buffalo Co. Van Slyke's sawmill at Butcher Ranch has already started in to get out the necessary lumber for the mill, boarding-house and blacksmith shop. It is proposed to push the work along with all possible speed so as to have the mill in running order before snow flies. The mine is in splendid condition.

A RICH STRIKE.—In the lower tunnel of the Glidden mine, Gold Valley, this week there was encountered a vein which measures from two to three feet in width, which shows up very rich in free gold. This tunnel is in the hill about 80 feet, and 200 feet in depth from the surface. The Glidden mine promises to become a bonanza to its owners, who are Mat Willoughby, William Jones, O. B. Dolley, and F. L. Glidden. Ed Lawrence and Jack Branden visited the San Luis mine day before yesterday. The tunnel is in 397 feet. The rock is getting softer and the indications are that the ledge is in close proximity. Thos. Murphy is prospecting a quartz ledge above the Chipp mine. The outlook for a mine there is considered quite favorable.

NEVADA.

Washoe District.

UNION CON. AND MEXICAN.—Virginia Enterprise, Oct. 6: The joint Union and Mexican north drift, started from the Ophir shaft on the 1455 level, has been extended 60 feet; total length, 410 feet.

CON. CAL. & VIRGINIA.—The south drift on the 1435 level is in vein material, giving low assays. The stipes east of the winze on this level continue to look and yield well. On the 1500 level the stipes on the southeast drift yield well. On the 1600 level ore is still being yielded by the stipes south of the Ophir line and 36 feet above the track floor. The stipes on the south drift and winze are showing much good ore. The usual amount of ore has been shipped to the mills and the assays average about as last week.

GOULD & CURRY.—On the 200 level east crosscut from the top upraise from the 300 level (or El Dorado level) has been extended 20 feet; total length, 77 feet. The formation is low-grade ore. The west crosscut started from the top of the same upraise has been advanced 32 feet. The formation is quartz giving low assays.

OCCIDENTAL.—Have completed repairs on the chute in the north incline winze. Extracted 140 tons of ore; shipped to the Atlanta mill 137½ tons. Average assay value, by wagon samples, \$25. Bullion shipped to San Francisco office, total yield from the Atlanta mill for September account, assay value, \$5657.77.

CROWN POINT.—The main south drift on the 700 level is again being pushed ahead. It is passing into ground of a promising appearance. The Suto tunnel drift is making good progress and will be connected in a short time.

BALTIMORE.—Are still operating on the 338 level. The machinery is working well, and there is

no trouble to handle all the water that comes in. The company will soon begin crushing ore at their own mill on the ground.

HALE & NORCROSS.—The drift west from the new 800 station is out 96 feet. The connections made will not only be of great advantage in working the mine, but will materially improve the ventilation.

IMPERIAL GROUP.—The Con. Imperial, Challenge Con. and Confidence mines are still closed down pending the repairs of the hoisting works at the Yellow Jacket shaft, through which they are all worked.

BEST & BELCHER.—On the 300, or El Dorado level, west crosscut No. 1 from the main northwest drift, has been extended 22 feet; total length, 258 feet. The formation is porphyry.

SIERRA NEVADA.—East crosscut No. 3 from the main south drift has been extended 50 feet; total length, 556 feet. It continues in porphyry filled with seams of clay.

ALPHA AND EXCHEQUER.—East crosscut on the 382 level of Exchequer is out 157 feet. The east drift in Alta is out from the old shaft 165 feet.

CHOLLAR.—The drift west from the 350 station has been extended 40 feet; total, 120 feet. The face of the drift is in clay and porphyry.

JUSTICE.—The work at the new mill is progressing well. Are steadily hoisting ore from the different reserves in the mine.

SAVAGE.—A good deal of work has been done on the several levels in the way of repairing and easing up timbers.

SEG. BELCHER.—Work confined to south upraise, where good progress is being made in a favorable formation.

ALTA.—Are engaged in making repairs to the main shaft and to the hoisting-works building.

LADY WASHINGTON.—Are making good headway in the raise above the 725 level.

YELLOW JACKET.—A good deal of repair work of various kinds is in progress.

KEYSTONE.—Good headway is being made in sinking the main incline.

Bristol District.

COPPER FURNACE.—Pioche Record, Oct. 6: The Roe Bros.' copper furnace at Bristol has been running for about 10 days. Fourteen tons of bullion were shipped to Milford last Tuesday. About 16 tons more will be produced, when a stop will be made. The present price of copper makes the business profitable, and we hope the boys will gather in a few thousands of the fortune which Bristol District certainly owes them.

Cottonwood District.

NICKEL.—Cottonwood has had hoisting works erected, and the nickel and cobalt increases in richness as depth is attained.

ALASKA.

ADVANCING.—Free Press, Sept. 29: Although Alaska has experienced no great boom this season, the country has nevertheless advanced very rapidly; a number of large mining surveys were made, which are the foundations for the near erection of a number of large stamp-mills, and a large amount of development on mining property has been done. The Treadwell mine has been a steady producer, the placer mines in the Basin have yielded well in gold dust, and late reports from the Yukon would indicate that the section will pan out this season in excess of last, not owing to any new discoveries being made, but to the increased number of men that have been mining there. When all reports come in this fall from both the Yukon and Copper river regions and from Cook's inlet, we confidently expect to hear of a number of rich discoveries as the result of the past season's prospecting.

COAL.—Although a number of men have devoted this summer to prospecting for coal in this near vicinity, nothing has yet been struck. Prospectors should bear in mind that around here the formation is not coal bearing. There is a sandstone belt to the north and one to the south, in which good coal veins might be found.

RICH ORE.—Andy Anderson now has a ton of \$500 ore packed down from the mine to his camp on Sheep creek, and siwasbes are now packing it down to the beach; it will be shipped below on the Ancon. Andy, working alone, takes out about 125 pounds ore daily, making two trips daily packing it down to camp. Specimens of ore from this vein will run 2000 ounces silver and from \$50 to \$200 in gold per ton.

ARIZONA.

WALKER DISTRICT.—Prescott Courier, Oct. 1: J. N. Rodenburg has come in from Walker district. From him we get the following items: He has built a house and is going to put men at work in his Berlin mine. N. L. Griffin and Fred Sable are sacking ore from the Fortune mine. Frank Kuhne will shortly ship two carloads of ore from the Belle mine. The Amulet is yielding lots of rich ore. John King is getting ore that will work \$800 to the ton. Mike Chandler is making from \$4 to \$5 a day in his placer claim. The district will poll about 60 votes. Harlan & Barrington, owners of the Howard mine, were at the Bank of Arizona Saturday last with over 400 ounces of gold product of five tons of rock. The "har" is worth nearly \$7000. Water is increasing and they will soon run the mill ten hours each day. G. K. W. McNary has just located two very rich ledges in Copper basin. Ore is rich in silver. Walter Murphy of Jerome says two cars a day of silver-copper bullion are being shipped East. Van Name's mill is crushing rich rock. N. L. Griffin, a pioneer miner of Walker district, has brought in a shipment of ore. A. J. Park says miners are prosperous in Hassayampa district. John Dawson and John Taylor have finished assessment work on the Gray Eagle, Bradshaw district. E. L. Gobin, miner and millman, says times are improving in Peck district.

THE WATERVALE.—Tombstone Epitaph, Oct. 1: From Superintendent Coffman, of the Watervale Mining Co., it is learned that the double compartment shaft, now being sunk in the Bunker Hill, is down 335 feet. Three shifts are running and work never ceases. The large double engine, now in construction in Chicago, will be finished and shipped

about the middle of October. Shipping receipts have been received by Mr. Coffman for 20 tons of material now on the way, including boilers, ore-cars and other machinery. The capacity of the new hoist is not exactly known, but it is sufficient for a depth far below the water level. The Rattlesnake, Mammoth, Bunker Hill and other properties of the Waterville Co. are rapidly developing under the able management of Mr. Coffman into bonanzas.

MOHAVE.—*Miner*, Oct. 6: There are 60 tons of ore from the C. O. D. on the ore platform at the sampling works ready for working. The Lone Star, at Mineral Park, is producing better ore than ever before. The ore streak is six inches wide, but very rich. It is rumored that a ten-stamp mill will soon be erected on Stockton Hill, and that Prescott parties are interested in the matter. Supt. Campbell of the Flores brought in Tuesday a bar of bullion valued at \$1500. The recent strikes in the Flores are developing finely, and the ledge is widening and increasing in richness. E. F. Thompson this week sold the Vanderbilt mine at Cerbat to a Philadelphia syndicate for \$10,000. Since the first of the year two miners have taken about \$7000 out of this mine, and it is considered one of the best properties at Cerbat.

AROUND PRESCOTT.—*Journal-Miner*, Oct. 6: Col. Bigelow has six tons of ore on the dump ready for shipment, and expects to complete a load this week. Work is being pushed on the smelter for the Copper Basin Copper Co. Work will be commenced again soon on the Perry mine, a property which has yielded several thousand dollars in gold ore. The United Verde Copper Co., a few days since, started up another 30-ton smelter, having two in operation now. Nearly two carloads of ore arrived at the sampling works yesterday from Congress mine, and the above institution is crowded at present. Charles A. Girdler and Dr. Vickers have been experimenting to-day with the treatment of sulphuret ore from the Congress mine, by means of electricity. Walter Wright continues to run the Del Pasco mill with good success as water can be obtained. He has an abundance of ore, but water is scarce. Freighters are engaged in moving a smelter to the Hillside mine, and the owners of that property expect to commence smelting their ores soon at the mine. The Crowned King continue to run their pack train getting ore to the mill, so as to be ready for a continued run when the water becomes plentiful, which is at present very scarce. A deed has been filed for record from John Lawler and Jules Baumann, for the Lawrence and Manzanita mining claims, Agua Fria district, the price named being \$10,000. Geo. W. Sines returned yesterday from a trip through the Hassayampa mining district. He says the new shaft in the Senator is down to a depth of 100 feet, and is in good ore at the bottom. Messrs. Harlan and Barrington, of the Howard mine, brought in another bar of gold bullion to-day, weighing 402 ounces, a total value of \$6834. This bar was the result of a run of five tons of ore from the mine. The property is not yet opened up to any great extent, but has yielded some \$20,000 or \$30,000, and has several hundred tons of ore in sight. J. M. W. Moore, of the Prescott sampling works, reports the largest receipts of ore yesterday, at those works, of any single day since they were started, amounting to over 40,000 pounds, or more than two carloads. Of this, 23,000 pounds were from the Congress, the remainder being from Lynx creek and Hassayampa districts. Captain A. T. Brann has just returned from a trip through the Bradshaw country, and reports the greatest activity there. W. B. Long, superintendent of the Ora Bella, has about 75 men employed in the mines and building roads.

COLORADO.

LEADVILLE NEWS.—*Denver Tribune-Republican*, Oct. 6: The Castle View mine on Carbonate hill was leased a few weeks ago by the Castle View Mining Co. to Captain Eben Smith. To open and drain the property a long shaft is being driven from the Henriette and Maid workings through the Big Chief to the Castle View. When drained, the Castle View will be worked through its own shaft. This is one of the most important enterprises in progress in Leadville at the present time, as it will make two more producing mines. The Big Chief, which has ore but has been much troubled by water, will commence shipping, and likewise the Castle View. The latter mine has been idle for some months on account of trouble in the company. The body of pyrite ore which was discovered some weeks ago in the Moyer, by a drift in the ore chute east of the shaft, is proving to be a very fair channel of good ore in the midst of the great body of low-grade sulphide ore. The Colonel Sellers mine is doing as well as usual, and in September will make its first monthly output of about \$50,000. The Glass-Pendery has started work again with its new plant of machinery. The shaft is being sunk at the rate of from 3 to 4 feet per day. Mr. H. B. Slater has returned from an extended business and pleasure trip through the East. While in Washington he secured the patents for his new process of treating blendeous silver ores. Experiments with the process are now being made in Denver. If these experiments are successful, as they are likely to be, it is more than probable that a plant of 200 tons per day capacity will be erected in Leadville by the Iron Silver Co. for the purpose of treating the low-grade sulphide ore of the Moyer mine before the winter sets in. Some ore was struck unexpectedly in the Virginus on Wednesday. A raise is being made through the flint to open a new stop in the body of iron ore overlying. In the flint the raise cut a body of lead carbonate ore two feet thick. The ore was of excellent grade, assaying 55 per cent lead and about 40 ounces silver.

IDAHO.

SHEEP MOUNTAIN.—*Ketchum Keystone*, Oct. 1: Numerous parties have of late arrived in Ketchum from the Sheep Mountain and Seaford districts for the purpose of marketing ores, shipping in fall supplies, etc., and nothing but the very best of reports reach us in regard to the outlook in that country. It is a fact beyond doubt that a number of mines there have large quantities of rich ore on the dump which is held simply in anticipation of better freight and reduction facilities. The mine-owners there unite in the statement that there is sufficient ore of desirable character in sight to warrant the establishment of smelters of moderate capacity, which, it is

the universal opinion, could hardly fail of success in the treatment of custom ores. The reported richness of mines in that region is corroborated by every miner who has been there. Most of the miners will, however, come out for the winter season, and we learn the store and bar in the camp of Seaford have already been closed.

THE TISHINGALE, owned by Mr. Harland, is one of the richest locations in the district. It is developed by several cuts on the ledge and one tunnel 22 feet in length, in which the ore is in place and continuous, showing several feet of very high-grade ore, and about ten inches that will assay in the neighborhood of 1000 ounces. There is a vast amount of ore in that country that is deceiving in character, much of which may prove to be very valuable. The formation is granite and lime with an occasional porphyry dyke. The ores are chiefly "dry," carrying less than 20 per cent lead, traces of gold and large quantities of silver.

PLACER DIGGINGS.—Kee Levah, a well-known China laundryman of this place, returned from Smoky a few days since with 15 ounces of gold dust, the result of four Chinamen's work for 30 days on a new prospect in that district. The ground is extensive and easily worked, the bedrock being but seven feet from the surface, but the ground thus far has not produced over \$2 a day to the man.

YREKA DISTRICT.—*Wardner News*, Sept. 29: The owners of the Emma and Last Chance mines have every reason to feel proud of the development of their property. The Last Chance is proving a veritable bonanza, and when the same amount of work has been done on the Emma, similar results may be expected. The Spokane Company's concentrator at the foot of the mountain is now in thorough working order and is kept running uninterruptedly.

ELK CREEK.—O. A. Brown, the original discoverer of the Elk creek gold mines, sold on Thursday all his interest in that property to Messrs. J. F. Wardner and B. Goldsmith.

LALANDE DISTRICT.—Nothing new can be said about the Poorioan mine at Burke beyond the fact that increased development but adds additional proof of the vast resources of the property, and the new concentrator is working to a claim. Supt. Clark says: Out of 100 to 120 tons of second-class ore, it produces 25 to 30 tons concentrates, which assay 65 per cent lead and 40 ounces silver.

DIAMOND HITCH.—Supt. B. B. Jones is more than pleased with the result of his labor on the Diamond Hitch mine. During the week the property was visited by Prof. Price of San Francisco, who expressed himself in unqualified praise of the good showing made in the mine, and says he has every confidence in its becoming a great ore-producer.

EAGLE DISTRICT.—The ditch being built by Syd Mills to convey water from East Eagle creek to Fancy gulch is nearing completion, four miles of the work being now finished.

CEUR D'ALENE DISTRICT.—The owners of the Mother lode made a rich strike last week in their middle tunnel by exposing a body of ore from 3 to 4 feet in width, bearing plenty of free gold. The tunnel is in 160 feet and development work continues day and night. Scarcity of water compels the necessity of working the adrastra only occasionally.

MONTANA.

GERMAN GULCH.—*Inter-Mountain*, Oct. 1: Dr. G. W. Beal came in from his placer mine in German gulch to-day and speaks in glowing terms of the favorable outlook for the new camp at the junction of German and Blacktail gulches. He reports some valuable lead discoveries being made there and a great deal of work in progress. The Anaconda Co. purchased a half interest in Thomas Newcomb's properties last week, from the good showing made in the Newcomb lode, which is down 40 feet.

THE LOWLANDS.—*Inter-Mountain*, Oct. 1: At the Butte City Sampling Works there was received on Wednesday a quantity of ore from the Amazon mine, in the Lowlands, which was assayed, and the result was \$400 in silver and 20 ounces in gold. This is about the richest quartz that has ever been brought to Butte, and the owners say that they have plenty of it in the Amazon mine.

THE RUBY MINE.—It was reported on the streets yesterday that another pocket of wonderful richness has been discovered in the Ruby mine, in the same district. Since the Anaconda Co. left the mine the owners have been at work and opened up this new find. It is said that the gold runs like wire through the rock and by breaking a piece of ore the yellow metal hangs together in threads. The proprietors of the Ruby express themselves as pleased that the Anaconda Co. did not take up the bond of \$200,000 on the mine.

CASTLE MOUNTAIN MINES.—*Butte Inter-Mountain*, Oct. 1: The great strike of the season has just been made by Ben Johnson and John Davis at the head of Thompson's gulch, about 15 miles west of White Sulphur Springs. This consists of a six-foot vein of gold ore that yields two or three cents per pound to both the lead matter and the regular ore from wall to wall. Mr. Johnson is of the opinion the ground will also pay for working for placer gold. This lead is believed to be the source from which the rich deposits of Thompson gulch came. There has been a big strike made recently in the Grasshopper lead, situated about six miles east of town. The rich body of ore was found about two weeks since, but the matter has been kept dark. The find consists of a four-foot vein of solid ore that runs in the hundreds. About six inches of this is very rich and assays 1200 ounces in silver. Several undeveloped properties in the vicinity of the Alice and Judge mines have recently been sold to capitalists. Such prospects rate at about \$500 each.

THE ALICE MINE.—The ore from the Alice mine is worth \$110 in silver and lead. It costs \$15 per ton to haul it to Toston, \$35 to treat besides, or 10 per cent, leaving a net income of \$40 per ton for mining. The mine is now developed to a depth of 100 feet, and a force of men has been set to work stopping. It is estimated that it will require three months to take out the ore in sight.

DEWEY'S FLAT.—*Inter-Mountain*, Oct. 2: The most profitable mine now in operation in this vicinity is the Looe Pine, owned and operated by the Partridge Bros. Their plant is on the Big Hole riv-

er, two miles below Dewey's Flat. Their power is a turbine wheel. The mine is on Quartz hill nearly 10 miles from their mill. During the first years of their ownership the mine did not prove very profitable. Only fair wages were made and nothing more. But for the last two seasons it has been improving very rapidly, running up from less than 20 ounces to an average of nearly 60 ounces per ton. During this time they have followed the ledge down some 300 feet. The Partridge Bros. are the only ones who have made a success of the Jones pulverizer of Portland, Or. They seem to experience no difficulty in regularly crushing about five tons when they have water to run all day. They amalgamate by the barrel process and save up to a high percentage that way. Allen Hay is steadily running his little mill at the Flat and is crushing ore from the old Quartz hill mine. This property is also improving in size and value as they attain depth, and from present appearances would amply repay the erection of a large mill. Quite a large amount of prospecting is now going on between Quartz hill and the Vipond district. About 20 men are engaged on different locations there.

PHILLIPSBURG DISTRICT.—*Butte Miner*, Sept. 29: H. K. Fairgrieve of Phillipsburg, M. T., reports the burg to be exceedingly active. Both the Granite and Bi-metallic mills are pushing their building operations. Superintendent Risque of the Bi-Metallic Co. has his company's mill on Douglas creek almost under cover. Much of the machinery is on the ground. Their mine is in most excellent condition, with enough ore on the dump to keep the new 50 stamps in constant operation for months.

SAN FRANCISCO.—Superintendent Eugene Smith reports this mine in most favorable condition. The east 400 is looking exceedingly well. This company has purchased a millsite just west of town and expects to break ground for reduction works early in the coming season.

THE PEARL MINE is looking phenomenally fine, and it looks as if this property in the near future would be a very valuable one and a producer of high-grade ore.

THE SYDNEY, under the management of Supt. Gable, is progressing in good shape.

THE GRANITE looks as well as of old and is still the whale of producers.

THE HOPE CO. is as usual pounding away with all their stamps. The superintendent is sanguine of the Silver Chief turning out a rich producer. The company are the pioneers of silver mining in Montana and who erected the first silver-mill in the Territory 20 years since.

DUNKLEBERG DISTRICT.—Reports from Dunkleberg are very encouraging for the future of the carbonate camp. The properties of Drs. Mitchell and Mussigbrod are regular producers and shippers of good grade ore. Dr. Mitchell is most sanguine in regard to what he hopes to be a second Leadville. The Hatta Co. at Dunkleberg is in active operation and developments being pushed.

NEW MEXICO.

ORGAN.—*Rio Grande Republican*, Sept. 29: Stubenrauch and Cowan will soon make a shipment from the Gray Eagle. Hayden, Davis and Robinson, who have a lease on the Modoc, have opened a cave which is said to be lined with mineral. The Modoc has an immense body of heavy galena ore, which runs well in silver. McCall is working a lease on the Little Buck. He is following a streak of ore to the line which bids fair to open out into a body of high-grade ore, such as has made several leases a good stake on the same property. Geo. Browne, who is a competent miner, has lately visited the camps of Hermosa, Tierra Blanca and Kingston. He returns satisfied that Organ has the best prospects for a permanent, paying camp that there is in the Territory. Prof. J. C. Carrera has again taken a lease on the Bennett mine. Clark & Brown have run a crosscut on the Ben Nevis, which is in 85 feet. The ledge at this point is 50 feet wide, of a concentrating ore, with rich streaks of smelting ore in several places. The Ben Nevis is one of the most promising properties now developed in the Organs.

PIÑOS ALTOS.—*Southwest Sentinel*, Oct. 6: Work in an energetic and practical manner is soon to be resumed on the Gold and Silver Ribbon claims located immediately west of and adjoining the Mina Grande, one of the clearest and most fissure veins in the Pinos Altos range. The Osceola, the northernmost extension of the famous Atlantic and Deep Dowe properties, makes a fine showing at 50 feet in depth. The crevice maintains its usual width, ranging from 6 to 15 inches of milling ore. The Thunderbolt, at 50 feet in depth, is proving to be just what the surface indications promised, namely, the making of a good mine. The Maggie B., on the Atlantic trail, is a new opening of one of the old prospects of the camp. The present owners, Messrs. Bagshy, Ashton & Harkins, are pushing work with commendable zeal.

GEORGETOWN.—Thos. B. Pheby has purchased of Geo. O. Smith the Commercial mine for \$10,000 and the Scottish for \$15,000. The Mimbres Mining Co.'s property at Georgetown, which includes the Naiad Queen, Glamorgan and several other silver-producing mines and a valuable stamp-mill, was sold at public auction on Saturday under a decree foreclosing a mortgage to Geo. Bliss, Thos. F. Mason and J. D. Hague of New York, for \$51,352.20. Mr. Thos. B. Pheby, who has had charge of this property for four years, will continue to manage it.

COOK'S PEAK.—Thirty men are employed on the Graphic mine at Cook's Peak by Messrs. Hadley & Co. As development progresses the ore increases in value, and it goes without saying that this noted property bids fair to rival some of the famous carbonate mining estates of Leadville.

OREGON.

RICH STRIKES.—*Bedrock Democrat*, Oct. 6: Word comes from Cable Cove of recent discoveries in quartz made by Doo Wickeizer and Wm. Reilly, the richness of which was wonderfully. A well-defined vein of gold quartz has been uncovered which shows gold in large quantities to the naked eye. The discoverers are recently from Nevada.

THE OUTLOOK.—The outlook of the mines of Cracker creek and of the country adjacent becomes brighter day by day. The mines upon which extensive development work is being done are showing up

in a manner that is truly encouraging, and new discoveries are being made almost daily. New properties that have only until recently been put to the test are coming to the front in a manner that indicates that the wealth of that part of Baker county is just becoming known.

THE GRAY EAGLE.—J. C. Young, one of the owners of the Gray Eagle mine at Cracker creek, came into town Monday evening and brought with him a large quantity of the finest galena and sulphuret ore ever seen in this city. The samples are taken direct from the breast of the tunnel, the ledge being about four feet in width.

CLOSED BY ATTACHMENT.—The Portland Reduction Works have been closed by attachment for several days past. It is thought that the company will soon be reorganized, and if this occurs a much larger plant will be purchased. If the Portland Reduction Works conclude to stand still it is said that a wealthy syndicate stands ready to erect reduction works of sufficient capacity to reduce all the ores that may be sent to that city.

PREPARING FOR WINTER.—Numerous mine-owners of Baker county have visited Baker City the past week to purchase the necessary supplies to carry on work at their properties all winter. From present indications they are a determined set of fellows, and by the coming of another spring enough development work will have been done on many locations to place them on a basis for future extensive operations.

UTAH.

ALTA.—*Salt Lake Tribune*, Oct. 6: A prominent mining man who visited Alta a few days ago says he was surprised at the favorable outlook there. He found 150 men at work about the various mines. The New Emma, Flagstaff, Windsor group, Buckland Tunnel, Toledo, Emily, Superior, Buffalo Tunnel, City Rocks, Prince of Wales, Revolution, Rough and Ready, and some others are active and some are showing well. The Prince of Wales was spoken of as doing well in the hands of leasers. He says the camp certainly has a good future.

THE SALE OF THE BROOKLYN.—*The Tribune* has already noticed the sale of the Brooklyn group of mines to the Lead Mining Co., but its importance was not fully shown up. The Brooklyn is one of the best developed mines in Utah, and has paid in dividends over \$200,000, the entire production of metal being over \$1,500,000. It is estimated that the ore on the dump and blocked out in the mine will produce over a quarter of a million more. The Brooklyn lies on the opposite side of a ridge to the Lead group, and over 200 feet higher. This will enable the company to connect the two groups by a tunnel about 1800 feet long. Thus connected, the tramway will be run into the Brooklyn so as to give easy and cheap transit for ore to mill and railway. Surveys for this tunnel are now being made.

CINNABAR.—*Utah Union*, Oct. 6: The Southern Utah cinnabar deposits are showing up well and attracting the attention of mining men.

COPPER.—On Sunday morning a complete copper smelter arrived in Frisco over the Utah Central railway and is being freighted across the San Francisco range of mountains to Copper Gulch, four miles from Frisco. It will there be erected and, it is hoped, will prove a profitable investment to the French syndicate now operating the Comet mine. This property is reported as making a splendid showing of ore in the development work now going on, and the outlook for Frisco is much brighter than it has been for a long time.

WASHINGTON.

WANNACUT LAKE DISTRICT.—*Spokane Falls Herald*, Sept. 30: W. H. Townsend returned last week from Wannacut lake, where he has been doing the assessment work on the Triune, Jessie, Occident, San Francisco and Silent Friedo lodes. They sunk a 20-foot incline shaft on the Jessie and have a three-foot vein of ore carrying chloride of lead, free gold and some silver. On the Triune the shaft will be sunk 100 feet this winter and a crosscut run from the bottom so as to determine the width of the vein. Chas. H. Schepstuer was the first to discover gold in the Wannacut Lake district. He first went to there in August, 1887, but could not remain long on account of the lack of supplies. He returned to Condonally for the winter and went back in February of this year. During the past summer considerable prospecting has been done and locations made. Next year the assessment work will have to be done on all the claims, when it is expected that many will show up well that are now unknown. Three companies have been organized to work in this district. One with a capital stock of \$500,000 has secured the Magebee, New Hope and Melvina lodes. Another with \$250,000 will develop the Powderly claim. Hall & Duham have organized a company with offices at La Canas and Portland, called the Wannacut Lake & Aetna Co., with \$50,000 capital stock. They have 12 claims. A three-stamp prospecting mill is now on its way to the district. It will be necessary to place the large mills on the Similkieen river, four miles from the mines, so as to secure an abundant water supply.

GOLD DISCOVERY.—*Spokane Falls Herald*, Sept. 30: A *Herald* representative learned on last Friday night that what bids fair to be an important gold discovery was made on Old Baldy mountain, several miles northeast of the city. Without making a special visit to the scene of the alleged discovery, it is impossible at this time to tell the extent and value of the find. It appears that Mr. Causey, who is interested in a milk ranch near the fair grounds, was out hunting some time since; while on the southeast side of the mountain named, he and his companion found strong indications of gold-bearing lodes. They returned to the city and provided themselves with the necessary tools, went back to the scene of the find and put in a blast in a favorable-looking spot. This shot threw out quite a quantity of quartz showing free gold. The discovery was kept secret for the time being and friends of the discoverers notified. The result is at present there are 20 claims located in the vicinity of the first discovery. No development work of any consequence has yet been done, so it is impossible to state with any degree of accuracy what the claims will amount to. Mr. Causey states that there is gold in the creek bottom near these leads and that he is of the opinion that placers exist there that will pay well for working.

MECHANICAL PROGRESS.

A Simple Way to Detect the Quality of Iron.

Much may be done in determining the character of iron by etching tests, which may be readily made in the following manner: Take a piece of polished iron or steel and immerse it in an acid solution. Let it remain there until the etching effect has proceeded to the desirable extent, which varies according to the grade and quality of the metal. When sufficiently etched, withdraw and cleanse the sample from the acid and thoroughly dry it. If, now, we take the etched sample and apply a thin film of printer's ink to its surface, a print can be taken from it upon paper in the same manner as from an engraved plate. The picture so made reproduces accurately the differences shown in the etched surface, and from it can be drawn various conclusions in regard to the character or value of the metal from which the sample was taken for the uses for which it was intended.

To make an etching acid, mix one ounce of sulphate of copper, one-fourth of one ounce of alum, and one-half teaspoonful of salt reduced to powder, with one gill of vinegar and 20 drops of nitric acid. This liquid may be used either for etching deeply into the metal or for imparting a beautiful frosted appearance to the surface, according to the time it is allowed to act.

Those who have never seen the class of prints in question have no idea of the beauty or delicacy of tint that they show, or how clearly various characteristics in regard to the structure, quality and workmanship of the metals tested are exhibited. The prints thus taken are inscribed with the necessary information as to the metal tested, its previous or intended service, etc., and all these filed for future reference, taking but little room. Their record is so complete that as a rule there is no necessity for keeping the samples from which they are made.

It is stated by those who have become experienced in making such tests that such etchings throw more light upon the structure of metals where failure has occurred, as in the case of broken axles, than the method often used of making photographs of the fracture of the point of failure, or of a broken sample. The lights and shades on an uneven surface of metal, as shown at a fracture, may often prevent the gaining of a clear conception, from a photograph, of the character of the metal, or of the part its physical characteristics played in bringing about the failure in question.

When iron rails were in use, this system of etching was especially valuable, though it really came into play but a short time before the manufacture of iron rails in this country had virtually come to an end, owing to the cheapness at which steel rails could be turned out. The head and web of the rail generally being of different metals, it was important to know whether the head was composed of a fine-grained homogeneous metal, and whether the weld between the two qualities of iron used was a perfect one. The latter point was shown in a remarkable clear manner by the etching process, and the discovery of imperfect workmanship from this cause has probably saved large sums of money in the past. The etching of rails was especially valuable in the case of "re-rolled" rails, when a certain amount of new metal was to be used in making the head. The impression from an etched section showed without chance of dispute whether the specifications were being lived up to or not.

In the case of steel rails a number of points are shown by an etching that are not always patent to an examination of the sample with the eyes alone. The relative closeness of fiber of two rails can be readily compared, and fissures, faults, or cinder-spots, which are not apparent at first sight, often show themselves clearly when the etching is printed. In steel axles the difference in closeness of grain between the center and the circumference is clearly shown, the metal at the edge giving ample evidence of the compacting influence of the hammer.

In iron axles or other forgings the degree of completeness of the working of the material is clearly shown, and it can generally be determined whether, in case of purchased material, the forgings have been made of new iron or of scrap. Etchings made parallel with the fiber of the metal also give a good deal of its toughness, and of the care with which it has been worked. The mysterious heating of several axle journals is sometimes cleared up by an etching of a section of the journal showing an unevenly wearing metal, having some spots more prominent than others.

The more experience we have with etching tests, the wider we find the range of their usefulness to extend. One advantage of this system of tests is that no expensive plant or extended chemical knowledge is required in making them. They are within the reach of any one who can get a lathe for cutting off the specimens, and a few cents' worth of acid to make the bath.—*Cotton, Wool and Iron.*

GAS FOR IRON MANUFACTURE.—The owners of natural-gas wells in Pennsylvania appear to be repeating the folly of the man who had a goose that laid him golden eggs. Much complaint has recently been made about the extravagant prices asked for the gas, and now we learn that quite a number of establishments are either going back to coal or will manufacture

their own gas from coal. It is reported that the Vesuvius Iron Works at Sharpsburg, Pa., will probably be the first iron firm to quit using natural gas. A new furnace is being built at this mill to manufacture gas from slack and nut coal. This gas is to be tried in the puddling furnaces also. It is estimated that about 5000 cubic feet of gas is required to make a ton of iron, and at the present rate charged for natural gas it comes high enough to warrant the construction of plants to manufacture fuel. Numerous iron manufacturers are closely investigating the chances of getting a fuel cheaper than natural gas at present prices.

SELECTING IRON FOR BOILERS.—When the heat rays, from any source of heat, strike a body, one of three things may happen: either they penetrate into the mass and are absorbed, or they pass through it, or they are stopped at the surface without penetrating, and are either reflected back in the direction whence they came, or by making the angle of coincidence equal to the angle of reflection, pass off in an oblique direction. Polished surfaces and those with a clean color are usually the ones that reflect heat with the least amount of absorption. Of these, mercury stands in the front rank, and brass comes next. Tin, steel and lead are the reflectors that have only three-quarters the efficiency of brass. White reflects; dark and dull colors absorb heat, as do also wood and earthy substances. But they may be made into reflectors by covering them with a glass-like crockery. These properties, whether radiating, conducting, absorbing or reflecting, have important practical applications; they show, for instance, that, in the manufacture of boilers, a metal with high conductive properties should be preferred to one possessing it to a lesser degree; that the thickness of the sheet should not be excessive; that the polish of the exterior surface should be very slight; that if it is desired to prevent the heat from radiating from the surface of the boiler or steam cylinder, they should be covered with some poor conductor like wood, charcoal, sarthy matter, felt, etc., and then by some high reflector like polished iron, copper or brass. It is by the application of these same principles that in summer we wear light-colored clothing to reflect the heat of the sun, and in winter, thick, dark-colored clothing to retain the heat of the body.

SUPERIOR MATERIAL.—It is asserted on high authority that the iron used in the construction of our war ships is superior to that entering into the construction of any other navy in the world. Uncle Sam has been a little tardy in the matter of providing a navy, but no rash experiments are being tried, and a good deal has been learned by the failure of others. On the whole, it is probable that nothing has been lost by the delay, if the work is now pushed ahead as fast as is practicable. Patriotic citizens will rejoice when the American navy is once more respectable.

NEW LOCOMOTIVE DRIVERS.—A locomotive has for some time past been on trial on the Lowell system of the Boston & Maine railroad, in which the periphery of the driving wheels, instead of being round are composed of a series of plain facets connected with each other by very obtuse angles. These flat surfaces are from one to two inches in length, and are intended to give increased traction. All tests of this engine thus far have been satisfactorily met. So says the *Boston Journal of Commerce*.

A NEW ROTARY ENGINE has recently been patented by J. E. Beauchemin, Sorel, Quebec, Canada. It has a series of cylinders secured radially on a hub which forms a valve seat, with ports and an exhaust chamber, the ports leading into the cylinders, in which pistons having central openings operate on the rim of a wheel held eccentrically to the hub. The engine can be operated by water, air or steam.

AN IMPROVED HAMMER.—An improved hammer has a groove in the side of the head into which the head of any sort of a nail may be slipped and by a single blow fastened in its position. The hammer is easily withdrawn without unsettling the nail, which is driven home in the usual way. The advantage is apparent, especially in driving nails in a place seven or eight feet above where one stands.

OLD IRON IN CHINA.—In China old iron is in large demand for manufacture into mining tools, hoes, rakes, spades, plowshares and pickaxes. The importations are chiefly of English-made iron. In 1887 the quantity imported into China was 4,285,000 pounds, as compared with 3,784,000 pounds the year before.

TO HARDEN COPPER.—Melt together and stir until thoroughly incorporated, copper and from one to six per cent of manganese oxide. The other ingredients for bronze and other alloys may then be added. The copper becomes homogeneous, harder and tougher.

AN ENGINE recently erected at Chihuahua, Mexico, is said to be the largest ever constructed in sections. It has 400 horse power, and weighs 100,000 pounds. It is a compound condensing tandem Corliss.

GOOD SUBSTITUTE FOR BRONZE.—Thirty parts of good brass (35 parts of zinc, 65 parts of copper), 16 parts of copper, four parts of phosphorus, No. 0.

SCIENTIFIC PROGRESS.

Electric Refining of Sugar.

Which, if Successful, Will Revolutionize the Business.

Sugar merchants and brokers all over the country are in a flurry at the announcement recently made to the effect that the much-mooted process of refining raw sugar by aid of electricity had been brought to a consummation, and that by the middle of October a refinery using this process exclusively would be in operation. It is said that a party of English and American capitalists, representing at least \$15,000,000, is now prepared to erect electric refineries in all the principal cities on both continents if the process should be proved to be successful by a trial which is to be made on the 10th of October. This trial will have as its proof 1000 tons of raw sugars refined at the Brooklyn factory within 34 hours from the initial deposit of sugar in the melter. If this scheme is all right it will cause a revolution in sugar refining that will mark an important era in the history of that article of commerce.

This system is, however, says the *Philadelphia Record*, the same that has been in process of completion for the last 10 or 15 years, and it is the same that has so repeatedly failed in accomplishing its purpose that the faith of those who at one time believed in its ultimate success was so frequently shocked as to create a prejudice against it and eventually secure the condemnation and arouse the incredulity of its erstwhile advocates. Of late years an almost universal opinion declaring this system to be impracticable has been in existence, and nothing short of a thorough exposition of the system and its principles will restore the faith of men in the sugar trade. This, it is claimed, has been given, but it was satisfactory only to a degree. In a refinery in Brooklyn, a few days ago, a quantity of raw sugar was refined in the presence of a party of gentlemen interested in the process. Thirteen barrels of the raw material were refined at the recent test.

The cans were put into a receiver, from which it passed through two secret rooms containing the machinery before being run into barrels in a refined state. What the machinery is no one, apparently, except the inventor, seems to know. The raw cane goes into the receiver, and, once it leaves that simple piece of mechanism, it is not seen again until it finds its way out through a chute at the further end of the two "mysterious machinery-rooms. During the time the machinery was in operation (25 minutes) the refined article was turned out at the rate of one barrel for every two minutes. The process of refining is claimed to be perfectly dry, and it certainly must be, for when it came through it was drier than the raw cane, and the crystals were absolutely perfect. The promoters of the scheme say it will turn out sugar in ten different grades, the only alterations in the machinery necessary being the changing of the plates in the granulators.

CRYSTALS OF BUTTER AND FATS.—Among the most remarkable exhibits made before the American Society of Microscopists at its tenth annual meeting in Columbus, Ohio, Aug. 21st, or, indeed, that have ever been made anywhere, were the lantern slides of the crystals of butter, and the fats used in its sophistication, adulteration and counterfeiting. These were from the photomicrographs of Dr. Thomas Taylor, microscopist of the department, and were colored in the most exquisite manner to represent the appearance of the crystals under polarized light. Dr. Taylor was the pioneer in the work, and it has been but a few years since the idea of using the microscope and polariscope appearances of the crystals of the different fats as tests of their purity, first presented by him at the Cleveland meeting of this society, was fairly hooted at by a large portion of the scientific men of the country. To the society is due the credit of first examining into Dr. Taylor's claim, and of reporting favorably thereon. To-day the very men who three years ago derided and lampooned Dr. Taylor are using his very methods, quietly and conveniently ignoring alike the origin of the same and their own unreasoning opposition thereto.—*St. Louis Medical and Surgical Jour.*

PURIFICATION OF MERCURY.—The author effects the purification by passing air through the mercury for 48 hours. The impurities, zinc, lead, tin, etc., collect at the top of the tube in the form of a black powder. The removal of traces of silver and gold is not necessary for mercury intended for filling barometers and similar instruments. These impurities do not affect the density of the mercury nor alter the appearance of the meniscus. The author considers that if pure air has any oxidizing action upon pure mercury it is so slight as to be scarcely appreciable. Platinum in thin foil is not attacked by mercury in the cold, but on prolonged boiling the platinum is attacked, the greater part remaining in suspension as a black powder.—*J. M. Crafts.*

ACCIDENTAL ALLOYS.—The astonishing changes which are produced by small proportions of foreign matter in metals are not necessarily of small practical importance, as very slight impurities in metals for certain purposes might lead to serious consequences. Robert Austin gives two striking illustrations of this possibility. A small fraction of his-muth in copper will reduce its electrical con-

ductivity sufficiently to cause any submarine cable made with it to become a commercial failure, and the message-carrying power of copper cables is said to have doubled since the early days of telegraphy, on account of the increased purity of the copper. Pure gold has a breaking strain of from 16 to 17 tons to the square inch; but when alloyed with but two-tenths of one per cent of lead it will break with a slight blow under a trifling strain.

OCEAN WAVES IN A GALE.—An English sea captain has made what are probably the most careful observations which have ever been recorded. He writes to the *Liverpool Mercury* that during a voyage around Cape Horn he measured the height of the waves in a gale. To do this he went up in the main rigging to get, if possible, the top of the wave coming up astern in a line of sight from the mast to the horizon at the back. The reason he selected the mainmast was this, that, as a rule, it is nearly amidships, and when the sea is running, the sea ahead and from aft lifts the two ends, forming a hollow amidships (the actual foot of the wave below the mean draught, equal to the slight elevation, and the observer necessarily is above the true height). It was a difficult operation, but he obtained some good observations, marking the height of the waves on the mast. On measuring the distances from these to the mean draught he found them to be as follows: 64, 61, 58 and 65 feet respectively, varying in length from 750 to 800 feet.

NEW TYPE OF PHOTOGRAPHIC PORTRAITS.—The method of obtaining the exact reproduction of a photograph, by which a genuine portrait under the form of a marble bust is the result, is thus given by *La Nature*: The model is placed behind a hollow column or thin pedestal of painted wood. If it has desired to represent a Roman emperor, a helmet of white cardboard is placed upon the model's head, his hair and face are whitened with rice powder, and those portions of the body that it is desired to render visible are surrounded with white flannel. The background should be formed of black velvet. It in no wise interferes with this operation if the arms be raised. After the negative is developed, the figure that it is desired to preserve is cut around with a penknife, and the arms and all the portions that are not wanted are scratched out. The glass thus becomes transparent where the scratching has been done, and in the positive the bust stands out from a black background.

THE LOS ANGELES BASE LINE.—Prof. Davidson of the United States Coast and Geodetic Survey has received telegraphic instruction to proceed with measurement of the base-line on the plains of Los Angeles, and his party is preparing to take the field at once. This base-line was selected by Assistant Lawson and the adjacent region carefully surveyed by Assistant Dickins. It is 10½ miles in length, and is the foundation of all the geodetic measures in the southern part of California, and is also a check base for the triangulation-work which has come southward from the Yolo base-line. The two measurements of the Yolo base-line made by Prof. Davidson differed only three-eighths of an inch in 10½ miles, and he hopes to beat even this record with the same apparatus. The members of the party are Messrs. Lawson, Morse, Nelson, Westdahl and Edmonds, and the whole number of persons at work will be about 24, with six or eight animals.

DEATH OF AN EMINENT SCIENTIST.—Dr. Clausius, memorable as the demonstrator, if not the originator, of the mechanical theory of heat, died August 24th, in his 67th year. His school days were spent in Berlin, and he particularly distinguished himself by proficiency in mathematics and natural philosophy. The bent of his mind was strongly in that direction, and he thus dropped into the study of certain questions in physics which finally led him to the elucidation of the great question of the mechanical theory of heat, which has placed his name high upon the roll of eminent discoverers in his particular line of investigation. If he was not the originator of the theory, he must at least be credited, by his work, "A Treatise on the Nature of Heat Compared with Light and Sound," with having transferred one of the most important natural laws from the domain of mere hypotheses to that of well-ascertained fact.

ELECTRICITY IN IRON MINING.—An application of electricity to iron mining is now proposed. It consists in the crushing of magnetic iron ore by crusher and rolls, and effecting a separation of the ore from the gangue by means of dynamos. An experimental plant is to be erected at one of the Marquette mines, and the machinery best adapted for work on a large scale tested. With the large water-rock piles of magnetite on that range, a due regard to economies and fair prices for ore, it is thought that there should be developed a paying business of handsome proportions.

CHLORIDES OF ALUMINUM.—In a note recently read before the Paris Academie des Sciences, M. Faure has described methods by which the chlorides of such substances as aluminum and silicon can be obtained in the dry way at a much lower temperature than has previously been the case. This he has accomplished by acting on the source of these elements at a red heat with a gas consisting of a mixture in suitable proportions of hydrochloric acid and naphthalene.

ENGINEERING NOTES.

An Ingenious Canal Lock.

French engineers have recently achieved a remarkable triumph in the line of canal locks, by which the principle of the common hydraulic elevator is in part applied to raising canal boats. One of these locks, or, more correctly speaking, "elevators," has been for some time in successful operation on the line of Nenfosse, in the northern part of France.

The system, briefly stated, consists in raising and lowering canal boats by balancing their respective weights, the process assisted by hydraulic pressure. The traffic on this canal, from the Atlantic to the highlands of North-eastern France, through the department of Pas-de-Calais, has reached 800,000 tons per year, and to raise each boat up the 98 feet incline at Fontinettes required under the old system five or six hours.

The engineers learned that Mr. Edward Clark had constructed in England a hoisting apparatus for 80-ton boats on the canal connecting the Trent and the Mersey. They adopted his plan, but enlarged and strengthened the "chambers" so as to raise a boat of 300 tons, and on the 8th of July the new lock was opened to traffic.

The plan consists, briefly, of two "chambers," reaching the whole distance from the level of the canal above to that of the canal below. In each chamber is a movable basin resting on the head of an enormous piston, which goes down into a cylinder below the level of the lower canal. The piston is worked by hydraulic pressure. The upright tubes, if we may call them such, can be connected or disconnected below by opening or closing an immense paddle-door. Thus the basin containing the boat can be made to slide up or down in the chamber, to the walls of which it is fitted.

Suppose a boat to have moved into one chamber from the level of the canal below, and another into the other chamber from the level of the canal above; the superior weight of the higher boat and the water floating in it in the basin rapidly sinks it till both boats are in the middle, when an equilibrium would naturally occur. To remedy this the water is withdrawn from the basin of the ascending boat, when a very moderate addition of hydraulic pressure causes it to rise to the level of the upper canal, as the other boat sinks to that of the canal below. The chambers or tubes are, of course, very strongly made, being lined with copper and ribbed with steel. Boats are now raised and lowered in three minutes instead of six hours, as formerly in the series of locks.

DAMMING THE RIO GRANDE.—A GIGANTIC SCHEME.—Late dates from El Paso state that Major Anson Mills of the Tenth Cavalry, at present stationed at Fort Grant, Ar., has addressed to the citizens of El Paso a project to construct a dam across the Rio Grande, four miles above the city, at a place where the bluffs come within 400 feet of each other and consist of solid rock, and where the bed of the river is also rocky. He proposes to build a dam 60 feet high of stone and Portland cement, and thus create a lake 14 miles long. This would hold water enough to permanently irrigate Rio Grande valley on the Mexican as well as the American side of the river. An irrigating canal could thus be carried past the city of El Paso 70 feet above its level. The water could be utilized for hydrants and fire-plugs, as the pressure would be ample. The lake thus formed would be from 6 to 8 miles wide and cover 50,000 acres of land which is not settled and is mostly owned by private parties. This would have to be purchased or condemned by legal process. The plan is very favorably received by the citizens of El Paso, and will probably be acted upon. It would also supply water-power to run all the factories in El Paso.

BUILDING UP—NOT PULLING DOWN.—In the construction of engineering works in this country the one problem to be solved is always how to build up, and there is never a thought of how to pull down. Consequently it is quite a novelty to read in the description of a new railway bridge in Sweden, that "there are holes in the granite pillars for placing dynamite in case it should be necessary, during a war, to blow up the bridge."

A NEW PRINCIPLE OF PROPULSION.—The Italians have made use of a new principle for the propulsion of some of their fast gunboats and torpedo-catchers under construction. They have improved on the twin screw of modern steamships by the addition of a third screw moved by a separate shaft and set of anginas. The three screws are placed in the angles of a triangular pyramid.

A NEW STYLE OF ELECTRIC RAILWAY is in process of construction in a suburb of St. Paul, Minn. The railroad is an elevated structure, and the cars are hung below it close to the street level. They hang from sets of wheels taking their power from the tracks, which are charged with electricity. A speed of from 8 to 10 miles an hour is claimed for the cars.

The new quartz mine in Bailey Gulch, Jefferson county, Montana, are looking well. A great deal of prospecting has been done there this season.

USEFUL INFORMATION.

THE INTERCEPTION OF TELEGRAMS OVERCOME.

As every great invention has its disadvantages, however trifling, so the telephone has its drawbacks, remarks *Iron*, London. The telephone is so acute of hearing that before it every secrecy of telegraphing disappears. If, formerly, it was desired to ascertain the secrets of the telegraph wire, the latter had to be cut, and an apparatus inserted. Now, with the help of the telephone, all telegrams may be heard unobservedly, even from a great distance. It is only necessary to carry a telegraph wire of moderate length parallel to the original line, and insert it in a telephone, from which the Morse signs may be read off by the ear. This would be very awkward in the case of war telegrams. Even guarding the line would be of no use, for the enemy might, at a distance perhaps of half a mile from the telegraph line, where he could not be seen, secretly set up his intercepting apparatus, consisting of a hundred yards of parallel wire and a telephone. How is this difficulty to be overcome? The question is solved in a surprisingly simple manner by Herr Heinrich Discher, who, in the *Elektrotechniker*, proposes cross telegraphing. If telegrams are sent from opposite directions on the same wire at the same time, the listener at the telephone only hears a potpourri of confused sounds. In practice, the matter may be solved in this way. One station sends actual telegrams, the other a dispatch previously agreed on. As long as the operator at the former station sees this dispatch coming in, he may be sure that no eavesdropper reads the telegrams he is sending. The Austrian war office is said to have paid great attention to the matter lately.

THE MYSTERY OF THE COMB.—It would be curious to know what mystic meaning our forefathers attached to so simple an act as that of combing the hair. Yet we learn from old church history that the hair of the priest or bishop was thus combed several times during divine service by one of the inferior clergy. The comb is mentioned as one of the essentials for use during a high mass when sung by a bishop, and both in English and foreign cathedrals they were reckoned among the costly possessions of the church. Some were made of ivory, some were carved, others gemmed with precious stones. Among the combs specially known to history are those of St. Neot, St. Dunstan, and Malchies. That of St. Thomas, the martyr of Canterbury, is still to be seen in the Church of St. Sepulchre, at Thetford, and that of St. Cuthbert at Durham cathedral.—*Cornhill Magazine*.

DETECTION OF GAS LEAKAGE.—Dr. Bunte's proposed new method for detecting gas leakage by means of palladium paper has been rendered still more delicate by Herr Schaufellers, who uses, to every three parts of chloride of palladium, one part of chloride of gold. The increase of sensitiveness may be partly due to catalytic action, that is, to the mere presence of the gold, perhaps to the action of traces of acetylene upon the gold solution. The solution used for making the paper contains three eighths per cent of chloride of palladium and one-eighth per cent of chloride of gold. One pint costs about 9s., and will steep filter paper enough for 8000 to 11,000 tests. The main sources of error are tobacco smoke, stove, and smoky chimneys, which let carbonic oxide into the room, the vapor of fuel oil, onion smell, mercury vapor, and sulphureted hydrogen.

A NEW WAY TO DRESS KID-SKINS.—An enterprising German leather manufacturer has discovered a way to tan American kid-skins so that they become in every way superior to the French article in durability and finish. "The process of tanning," says the *New York World*, "is performed entirely by American workmen, and the skins sell for from 50 to 70 per cent less than the French. Not only are the shoe manufacturers all over the country using the new product, but already thousands of dollars' worth have been exported to Germany, France and Austria. The dressing of kid-skins was almost monopolized by France until this manufacturer hit upon an idea better than theirs."

AN UNBREAKABLE SUBSTITUTE FOR GLASS.—An unbreakable substitute for glass is made by M. L. C. A. Marguerite of Paris, by immersing wire gauze in a heated etatin in a thin paste formed of soluble glass, gelatin and glycerine, or glucose, in proportion varying according to the use for which the material is designed. When nearly dry, the sheets are dipped in a concentrated solution of chrome alum or bichromate of potash. Any desired coloring-matter may be incorporated with the gelatin, and copal or other protective varnish may be applied to the "vitro-metallic" pane.

KICKER AND CROAKER.—The kicker is a developer; the croaker is an incubator. The kicker incites to improvement; the croaker to indignation and resentment. The kicker only is heard when he is given \$1 accommodations at \$3 rates; the croaker would have just as noisy if he was getting \$3 accommodations and paying nothing. The kicker is a lively, jovial, progressive fellow; the croaker is a dismal nuisance, who lags superfluous on the stage.

LUBRICATING VIRTUES OF VARIOUS OILS.—The Italian Admiralty have, recently caused to

be carried out a number of experiments with a view to testing the comparative merits of castor oil and of olive oil for lubricating purposes on board ship. From the results thus obtained they have given orders that henceforth all exposed parts of machinery are to be lubricated exclusively with castor oil, while the mineral oils are to be used for cylinder and similar lubrication.

A DEEP HOT-WATER SUPPLY.—A remarkable instance of the increase of temperature in the earth toward the center has been presented at Peath, where the deepest artesian well in the world is that now being bored for the purpose of supplying the public baths and other establishments with hot water. A depth of 8140 feet has already been reached, and it furnishes 176,000 gallons daily at a temperature of 158° F. The municipality have recently voted a large subvention in order that one boring may be continued to a greater depth, not only to obtain a larger volume of water, but at a temperature of 176° F.

A SOUTHERN CORRESPONDENT OF THE CULLIVATOR finds that a pure article of hog's lard rubbed in is a most excellent remedy for warts on horses, and will invariably effect a cure at the first application. In a varied experience with horses, cattle and mules, he has never known a wart to withstand a second application. They generally commence sloughing off after the first application, and, to all appearances, without the slightest pain. The remedy is simple and may be worth trying.

A LONG LINE OF SHAFTING.—Wm. Contie & Son of Troy, N. Y., recently placed an engine near the center of a line of shafting 2300 feet in length. The next longest line of shafting is said to be running at Power Hall, Cincinnati, which is only 900 feet long.

TO REMOVE THE "GLAZE" FROM CLOTHING. Soil or shininess on coat-collar or sleeve may be removed by sponging them off once or twice a week with the following preparation: One ounce of ammonia, one ounce of alcohol, one ounce of ether, one quart of water.

ONE HUNDRED AND TWENTY-TWO passenger trains leave the Grand Central depot, at New York, daily.

GOOD HEALTH.

Annual Sanitary Review.

Dr. Barger, the Health Officer, has filed with the Board of Supervisors his annual report, from which is taken the following statistics:

There were 6036 deaths in the city during the past year, against 5359 the preceding year. The death rate has been slightly in excess over last year. The rate per thousand last year was 17.86; this year, 18.27.

The death rate among the Chinese in the city has been 17.63 per 1000; among all others, 18.36. The smaller death rate among the Chinese may be accounted for from the fact that they have but very few children, among whom the proportion of deaths is always much larger than among adults.

The principal diseases and the number of their respective victims were: Consumption, 905; cancer, 190; heart disease, 387; smallpox, 69; diphtheria, 151; typhoid fever, 152; eczema, 28; pneumonia, 577; Bright's disease, 132; bronchitis, 173; violent deaths, 296.

The excess of deaths from consumption over those of the year preceding was 133, from pneumonia, 266; from heart disease, 95; and from bronchitis, 118. The record for the preceding year shows no deaths from smallpox. The total of zymotic diseases for the year is 888, against a total of 810 for the year preceding.

The number of births registered is 1780, against 1346 for the preceding year. The proportion of these figures, as compared with the deaths, is due to the neglect of physicians to register births as required by law.

The dread disease of cancer stands fourth on the list in the number of its victims. This fact calls loudly for an investigation into the alleged "cure for cancer" by a practitioner in this city, which treatment is ignored by the medical faculty, notwithstanding the abundant evidence of its verity, which is open every day to the faculty and the public at 224 Post street, where numerous patients can daily be seen under treatment and the curative process witnessed. The matter will undoubtedly be brought before the Legislature at its coming session, and the reason why our State Board of Health refuses to investigate will be inquired into. So far as our personal observation goes, we do not think there is 1 in 100 of the people, outside of the faculty, who, if the question was put to them, would not demand an investigation in the interest of both science and humanity.

Smallpox.

The Board of Health has been very active and efficient in securing every possible immunity from this scourge. The number of cases of smallpox reported in this city during the year was 568, of which only 69 resulted fatally. The cost to the city has been \$45,000. Measures are still in progress which aim to prevent any further outbreak. Danger is to be expected from the cast-off clothing of patients, which was laid aside before seeking the hospital. All such apparel should be destroyed or carefully fumigated.

gated. Another source of danger is from infected rags, which may find their way to some of the factories in and about the city engaged in making rag carpets, mattresses, etc., from such refuse. The Health Officer has very properly reported these matters to the Board of Health, which promptly insisted upon a proper cleansing and disinfection of the rags before being used. The garbage and sewerage question in this city is also engaging the attention of our health conservators.

The Yellow Fever.

The State Board of Health has appointed Dr. S. S. Herrick as Sanitary Inspector, to visit the southern borders of the State, with a view of investigating the introduction of infectious diseases in California.

The new inspector has established his headquarters at Yuma, and already entered upon the discharge of his duties. His first inquiries will be devoted to an investigation as to the likelihood of the introduction of yellow fever in this State. He will also turn his attention to the spread of smallpox, as black smallpox is known to exist in Mexico now.

Dr. Herrick is said to have had a wide experience as a sanitary officer, having been connected with the Board of Health of New Orleans during two yellow-fever epidemics. He was also for a time in charge of the San Francisco pesthouse.

CONTAGIOUS DISEASES.—Scarlet fever, a contagious disease producing a large annual mortality, is caused by a specific poison which emanates from the person of the patient, and can be caused by no other means, and this poison is remarkable for the tenacity with which it affixes itself to objects, which, if portable, may convey it long distances, and for its tenacity of life, which renders it difficult to destroy. Diphtheria, also a contagious disease, and largely fatal, may also arise from other causes than contagion, notably from fermenting filth, and requires, not only isolation, but cleanliness for its extinction. Typhoid fever and Asiatic cholera, while not directly communicable from person to person, are spread by the dejects of their victims, which contaminate the water-supply, and thus an efficient disinfection of these dejects is a very desirable thing to accomplish. Smallpox may be exterminated by vaccination, and this, I am happy to concede, is a fact on which the public requires less information than most others, albeit there are skeptics here. It is evident if the public knew how diseases arise and are disseminated, it would be prepared to more heartily and effectually second the endeavor of sanitarians to limit and subdue them. In proportion to its knowledge of sanitation would its zeal increase.—*G. A. Collamore, M. D.*

CHINESE HAVE NO NERVES.—The *North China Herald* says the quality of "nervelessness" distinguishes the Chinaman from the European. The Chinaman can write all day, work all day, stand in one position all day, weave, beat gold, carve ivory, do infinitely tedious jobs for ever and ever, and show no more signs of weariness and irritation than if he were a machine. This quality appears early in life. There are no restless, naughty boys in China. They are all appealingly good, and will plod away in school without recesses or recreation of any kind. The Chinamen can do without exercise. Sport or play seems to him so much waste labor. He can sleep anywhere—amid rattling machinery, deafening uproar, squalling children and quarreling adults. He can sleep on the ground, on the floor, on a bed, on a chair, in any position. It would be easy to raise in China an army of a million men—nay, of ten millions—tested by a competitive examination as to their capacity to go to sleep across three wheelbarrows, head downward like a spider.

EFFECTS OF SEASICKNESS AND THE REMEDY.—Dr. Dastre, a French physiologist, who has been experimenting with animals to determine the nature of seasickness, reports that after they had been subjected to various kinds of motion, corresponding to the rolling and pitching of vessels, he found their intestine strangely mispleased. He concludes that a similar disturbance produces seasickness on board ships. Cocaine is said to be an excellent remedy. Another French physician, who agrees with Dr. Dastre as to the cause of seasickness, claims to have discovered two infallible remedies, one a mixture of atropine and erythrine, and the other caffeine.

SIGNS OF DEATH.—It will probably surprise most people to learn that both cessation of respiration and of movement of the heart are rejected as signs of death by a French lecturer, in considering the precise moment when life ceases. Heart beats have been known to continue for an hour after the body was beheaded, while, on the other hand, they may temporarily cease in fainting.

SALICYLIC ACID FOR RHEUMATISM.—Dr. Donald C. Hood has collected many facts relating to the use of salicylic acid for rheumatism. Of 728 patients treated with salicylates, 523 were relieved of their pains within seven days, whereas of 612 patients treated by other methods only 140 were relieved within the same time.

WEAKNESS OF THE EYES.—It is not generally known, but should be, that weakness of the eyes is often due merely to dyspepsia.



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SAN FRANCISCO

Saturday Morning, Oct. 13, 1888.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Weighing Quicksilver and Filling Flasks, New Almaden Mine, 237. Leaching Tank for Russell Process; Lumber Chute at Fort Ross, Sonoma Co., 245. A. J. McNicoll & Co.'s Patent Hydraulic Elevator, 249.

EDITORIALS.—Quicksilver Flasks; Mining Law Suggestions, 237. Passing Events; Mexican Mining Investments; Legislating for the Protection of the Mineral Domain; Erroneous Chronology of the Marshall Gold Find, 244. Use and Progress of Electrical Engines; Chute Landings; The Montana Co.'s Mine, 245. Something About Elevators; Poultry Notes; Agricultural Title to Mineral Lands, 249.

CORRESPONDENCE.—Marganiferous Silver Ores; Ore Feeders; Nevada Mining Notes, 238.

MISCELLANEOUS.—The Russell Process, 239.

MECHANICAL PROGRESS.—A Simple Way to Detect the Quality of Iron; Gas for Iron Manufacture; Selecting Iron for Boilers; Superior Material; New Locomotive Drivers; Improved Hammer; Old Iron in China; To Harden Steel, 242.

SCIENTIFIC PROGRESS.—Electric Refining of Sugar; Crystals of Butter and Fats; Purification of Mercury; Accidental Alloys; Ocean Waves in a Gale; New Type of Photographic Portraits; The Los Angeles Base Line; Death of an Eminent Scientist; Electricity in Iron Mining, 243.

ENGINEERING NOTES.—An Ingenious Canal Lock; Dam and the Remedy, 245.

USEFUL INFORMATION.—The Interception of Telegrams Overcome; The Mystery of the Comb; Detection of Gas Leakage; Dressing Kid Skins; Substitute for Glass; Kicker and Croaker; Lubricating Virtues to Various Oils; A Deep Hot Water Supply, 243.

GOOD HEALTH.—Annual Sanitary Review; Contagious Disease; Chinese Have no Nerves; Effects of Scarciness and the Remedy; Signs of Death, 248.

OUR LUMBER INTERESTS.—A Novel Method of Piling Lumber; Timber Resources of the South; A Great Lumber State; Straw Lumber; The Lumber Exhibit at the Mechanics' Fair; The Railway and Lumber Business; The Export of Lumber; Lumber in California and Florida; The River Plate Lumber Trade; Logging in Humboldt County; Southern Hard-Woods, 246.

SAW MILL NOTES.—Care of Saw-Teeth; Great Sawmill Feat; The Largest Sawmill Plant; Sawmills in Michigan; Sawmills Increased in the South, 246.

COTTON AND WOOL.—Inferiority of American Wool to European Explained; A New Material for Cotton Bagging; Cotton-Picking in India; The New Woolen-Mill at Woodland; Why Calico Was so Called; Change of Base; Compressed Wool for Long Hauls; Our Wool and Wool-Manufacturing Industries; Wool-Growing North and South; Bleaching Wool with Bisulphide of Soda, 247.

STEAM BOILER NOTES.—A New Boiler Feeder; For Use in the Engine-Room; A Good Fireman Necessary, 247.

FLOUR MILL NOTES.—The Starr Mills at Crockett; Barley Growing in India; Morocco as a Wheat Producing Country; Support Your Own Industries; English and American Flour; Gambling in Grain; The Wheat Deficit in France; Flour Milling in the South; Flour Milling in Baltimore; A Great Wheat Market; State Millers' Association, 248.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 240-41. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board, Minutes of Meetings, Assessments, Dividends, and Bullion Shipments, 252.

Business Announcements.

[NEW THIS ISSUE.]

Amalgamating Pans Wanted—Box 45, Silver City, Idaho. New Chemical Gold M. Co.—Meriden, Ct.
See Advertising Columns.

Passing Events.

Political affairs are just now attracting attention more than anything else, but in a few weeks this will all be over and people will settle down to business again.

Prospecting is about over for the season in most parts of the coast, though in this State, except in the more mountainous portions, it can be carried on for some time yet. During the winter the prospector's occupation is gone, and those who have been searching over the mountains now gather to the towns and camps. It will probably be some months yet before

any active steps are taken in the matter of the Government Commission to investigate the debris question. It is to be hoped that this time the subject will be thoroughly examined by competent and unbiased engineers.

Considerable attention is being paid in this State to prospecting for oil, coal and gas. All of these substances have been more or less neglected in favor of gold. There are other mineral products besides these which ought to be developed in California, but capital is needed, and that is not so abundant for such purposes as it ought to be.

Mexican Mining Investments.

From time to time we have referred to the advance in mining matters in Mexico. While in some cases foreign investors have been well repaid, in many the amounts risked have been lost; this, too, in cases where the speculation was most promising and the mines apparently of value.

Inquiry into the causes of some failures brings us into the possession of facts which are worthy of consideration by parties who are favorably disposed toward investing capital in Mexican mining ventures.

Mexico is at our very door, yet it is a country whose manners, customs and language are totally different from our own. The engineer who, never having had any practical experience in the management of mining properties in that country, goes there to report on a property, is handicapped to that extent that his report may be utterly valueless.

Any one unable to speak the language sufficiently well to personally direct his operations will, in 99 cases out of 100, be taken in. Experience would teach him that the Mexican people always desires to please, and in answering questions will endeavor to give the answer he thinks wanted, irrespective of what the truth may be. This prevarication is really done from a desire to please, and not maliciously. If the engineer does not speak the language, he is at the mercy of his interpreter for all collateral data. Outside of what the engineer sees with his own eyes, the matter on which the value of his report depends comes to him through his interpreter; hence the value of the report is contingent on the veracity of the interpreter.

To be safe, no one should employ for the examination of a Mexican property an engineer who has not had practical experience with the class of people he will have to deal with or who cannot speak Spanish.

The country is notorious for rich veins, and this often misleads engineers, for, with very few exceptions, the average value of the vein decreases with depth while the width remains unchanged. We do not wish to be understood as saying that the ore of all the veins decreases with depth; still, where veins have been profitably worked at a depth an examination will generally show that a bonanza, or, as the Mexicans will say, a "claro rico," has been struck. In short, Mexican mines are pockety. This being the case, the past history of the mine is no criterion on which to base the future prosperity of the concern. What is *in sight* should be the only factor taken into account when estimating the value of a property. Then as to traditions; hardly a report comes to us relative to a Mexican property that does not predicate immense wealth from the mine on its tradition; they are worth just the paper they are written on, no more.

Should some tradition be eventually proved true, it must be considered a wonderful piece of good fortune.

The facility with which traditions grow is exemplified in the case of a Sonora mine, which was the property of a San Francisco company. Work was suspended on account of the unsafe condition of the shaft and the property shortly after abandoned. At the time work was suspended, about 20 tons of ore, assaying some \$30 to the ton in gold, was broken in one of the drifts. Some five years later, the old superintendent being in the neighborhood of the mine, concluded to take a look at it. He found, as was anticipated, that the shaft had caved to the surface. A Mexican living near by gravely informed him that the cave in the mine had buried 300 tons of ore worth \$100 per ton; so much for traditions.

There are to be had thoroughly reliable engineers whose reports can be depended upon, so a company may come into possession of a really

valuable property; but the simple fact of owning a valuable property is no guarantee of the financial success of the same. The method of treatment of the ore is a very serious question with a Mexican property; the questions of fuel, transportation, water, facilities for repairing machinery, etc., require much more consideration in that country than they do in this. Methods of reduction that would be advisable in this country might bankrupt a company there. Six months given to the study of the best manner in which to handle the product of the mine would seem to be time lost, but in the long run it would be found to be money gained. In the meantime developments can go on in the mine; good reserves mean economical working. The question of management on the property is one of vital importance. The greater part of the failures, where the mine has had any value at all, will be found to have had their cause here, and generally the cause will be found to be too much management. The idea that a man can sit in his office in the United States and economically administer the affairs of a property thousands of miles away is simply preposterous. A general line of action may be laid down for the superintendent, he being free to carry it out in any way he may deem most advisable. This makes him personally responsible for the results, whereas if he were acting under the orders of a man from whom it would take 10, 20 or more days to get an answer when instructions were required, sooner or later there must come a conflict of authority which can only result in damage to the property and financial loss to the company.

Legislating for the Protection of the Mineral Domain.

Having had something to say of late in regard to the manner in which the mineral domain is being unlawfully taken up as agricultural land, it is gratifying to see that our efforts in that behalf are being seconded in influential quarters. Senator Stewart of Nevada has introduced in the U. S. Senate a bill designed to guard against this reprehensible practice, so far as may be. The details of this bill have not, we believe, been fully perfected, Senator Stewart being desirous to further consult with his mining constituency in regard to its provisions before having it reported on in committee.

The matter is one of inherent difficulty, and it is not easy to say just what additional legislation is required to cure the evil complained of; that is, how a law shall be framed that will duly protect the rights and interests of all parties concerned—the miner, the public and the agricultural claimant.

In this strait it is well that the trustees of the State Mining Bureau have appointed a committee, consisting of two of their number, to inquire into and consider what further remedial measures should by Congress be adopted, there being already a law on this subject. But the trouble is, this law, never very efficient, has, by the various decisions of the Land Commissioner and the Department of the Interior, been rendered so nearly negatory that it calls for stringent amendment; the decisions alluded to having almost always been notoriously favorable to the agricultural; homestead, railroad or other claimant contesting the mineral character of the land.

This committee of the Mining Bureau will confer with Senator Stewart on his arrival in the city, tendering such suggestions touching the amendment of the present law, or the framing of an entirely new one, as they may deem expedient. As these representatives of the Mining Bureau are conversant with the matter in hand, and the committee comprises some good legal talent, it may be expected that anything they may have to offer in this connection will be duly appreciated by our national law-givers as well as by the public at large.

The management of the Horn Silver mine, Utah, has not been very satisfactory to all the stockholders, but at the recent annual meeting the "Franklyn" management was defeated, and the mine passes into the hands of Bache McE. Whitlock and Allan C. Washington of New York, Jas. T. Little and Joe Jennings of Salt Lake City and Frank Farnsworth of Beaver City, Utah, and other minority stockholders.

The advancement of all mining sections depends considerably upon capital being invested to open up the hidden wealth.

Erroneous Chronology of the Marshall Gold Find.

About one year ago there was brought to light and published in this city a diary, or portions of a diary, kept by Henry W. Bigler, one of the men employed on the Sutter sawmill at the time of the Marshall gold discovery. In this diary occurs an entry which purports to have been made on the day that that discovery took place, but which conflicts with the heretofore accepted date of that event, which, according to Marshall, Sutter and others in a position to be correctly informed on that point, occurred on the 19th day of January, 1848. According to the entry in Bigler's diary, it occurred on the 24th day of that month.

As there seems a disposition on the part of some writers to adopt this latter as the true date of the gold discovery, it may not be amiss to examine a little and see what, if anything, there may be to justify such change in the chronology of that notable occurrence.

According to Marshall and Weimer's version of the discovery, they two were, on the morning of January 19, 1848, walking down the mill-race to see what execution the water let in the preceding night for the purpose of deepening the channel had effected. Marshall being a little ahead, was the first to spy a piece of yellow metal lying on the side of the race, which, picking up, he and his companion, after careful examination, came to the conclusion was gold. Searching further and finding more of this metal, they resolved that they would keep the discovery a secret long enough at least to enable them to get in a stock of saw logs, the mill itself being then about completed. They knew, as subsequently happened, that if the secret got out the men in their employ would at once quit work and go to gold-digging, thereby putting an end to all log-hauling and lumber-making, notwithstanding the latter was so much needed at the Fort.

Adhering to this resolution, both Marshall and Weimer assure us that they kept the gold find a profound secret for several days after it happened, having succeeded meantime in getting a supply of logs cut and hauled to the mill; this accomplished, they let the secret out—that is to say, having kept it to themselves until the 24th of the month, they then gave it publicity, and the fact coming to the ears of Bigler, he, as was his wont when anything noteworthy happened, jotted it down in his diary, the entry running thus: "January 24th—This day some kind of metal that looks like gold was found in the tail-race." Now clearly Bigler could not have made that entry on the day the gold was found; to suppose that he did would be to presume that Marshall and Weimer rushed off at once, and not only acquainted our chronicler with the fact, but took along a quantity of the yellow metal for his inspection, which would be to gainsay reason and discredit all that these men have told us about the circumstances attending the gold discovery.

That Bigler did not at the time attach much importance to the reputed gold find is evident from the fact that there appears no further entry in his diary until January 30th, when the following remark occurs: "Our metal has been tried and proved to be gold. It is thought to be rich." For nearly a week after the discovery, adopting his own chronology, he continues working on and about the mill, paying so little attention to it that only after the expiration of six entire days does he find out that the metal is actually gold.

The discrepancy between these dates is easily explained. Marshall gives us, as he had every reason to do, the veritable day on which the discovery took place; Bigler the day on which he first heard of it, under the impression, probably, that it was really the day on which the event happened, or he might have worded the entry in the manner he did through inadvertence. Nor is it on the testimony of Marshall alone that this version of the ever-memorable incident rests. It is confirmed by the statement of Peter L. Weimer, Mrs. Weimer, his wife, and all the hands at the mill other than Bigler, and even by that of General Sutter himself, who could by no possibility have been mistaken on this point. To suppose that all these people, who had the best of opportunity to know whereof they speak, and the best of reasons for speaking correctly, should have been mistaken, or that they conspired to testify falsely, is out of the question.

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C. A. PILLSBURY & Co., the famous Minneapolis millers, who four years ago inaugurated the profit-sharing system, have recently distributed \$40,000 among their employees.

OUR LUMBER INTERESTS.

A Novel Method of Piling Lumber.

There seems to be no limit to the applications of mechanism, and this is well illustrated by the novel lumber-pile, the invention of Mr. Carlos E. Donshee of Chicago, Ill. The invention consists, essentially, of a portable framework that is well braced. Inside the framework are track-rails, suspended by means of ropework. These ropes pass over grooved pulleys at the tops of the posts, and are thence carried down to spools and attached. These spools are so placed near the base of four of the main posts of the framework that all the ropes for elevating the tracks are connected with them. The spools are all connected by means of horizontal shafts and beveled cog gearing, so as to move in unison when impelled by means of power applied to the gearing. Upon the tracks run a car having four-flanged wheels.

This car has at each end a series of pendent hooks, which are attached at their upper ends to cross shafts, which permit a vibratory movement of the books. The car is composed of a light frame, and attached to the rear cross-piece, and hanging down, are pieces of metal that act as gauges for one end of the lumber. Short trestles stand upon a wooden floor, to which four of the main posts of the framework are secured at the base. The operation of piling lumber by this method is very simple. The trestles are first placed at such a distance apart that the ends of the lumber will project several inches. The lumber is now laid upon the trestles, one course or more at a time, and at any width desired up to the capacity of the apparatus. The tracks, together with the car, while the lumber is being arranged upon the trestles, are suspended above and out of the way of the operatives. When all is ready the tracks are permitted to descend, carrying with them the car, the books for catching the lumber having been turned back by means of a rope in the meantime, pass below the ends of the boards, and are then permitted to assume a normal position below the boards. If power is now applied to the gearing, the car will be lifted, and when at the proper height, the car is moved along the track by means of ropes that hang down within easy reach, until it stands over the lumber-pile. If the rope that operates the books is now pulled, the boards will be dropped upon the top of the pile. The car, being relieved of its load of boards, is now run back to the position over the trestles, when the operation described can be repeated, it being only necessary to lift the car each time as much higher than before as to allow for the increase in height of the lumber-pile by the preceding last load of boards. By this means lumber can be piled to any desired height, and with the expenditure of but very little time or labor in comparison with the ordinary methods. This invention will soon save its cost, and all those engaged in the production, sale or consumption of lumber should investigate its unusual merits.

Timber Resources of the South.

J. E. Emerson of Beaver Falls, Pa., writes to the *Journal of Progress* on the timber resources of the Southern States, as follows:

"When in North Carolina nearly one year ago, I made inquiry as to the supposed amount of timber still standing in the Southern States alone, and on getting hold of the United States census of 1880, I found that there was at that time supposed to be 112,176,000 feet of 'long leaf pine' alone, besides the vast quantities of 'hard timber,' of excellent qualities, comprising over 200 different kinds of wood.

"Georgia appeared to be the leading State for timber and lumber mills. Of her 137 counties, 73 of them had large pine forests. She then had 665 sawmills, valued at \$4,875,452.

"The total capital employed in the Southern States at that time in lumbering was estimated at over \$21,000,000, and the total product at over \$36,000,000, which must be increased at the present time to over \$50,000,000.

"The ten cotton States alone cover an area of 690,000 square miles, with a population of over 13,000,000.

"Railroads are being built and projected for the development and utilization of these vast forests, for English capital is finding its way there in purchasing hundreds of thousands of acres of this timber, including the lands which are being settled to a considerable extent by foreign population.

"The pineries of the Northwestern States are being rapidly exhausted, and those of the Southern States as yet hardly touched, must, of necessity, soon become the main source of supply, and will be more largely drawn upon for the wants and necessities of home trade and commerce.

"The long-leafed pine is the most valuable timber of the South, and must come into general use for building material; while the oak and walnut make the finest furniture and ornamental work of any in the world.

"Northern lumbermen, with their skill and genius, accompanied by capital, are finding their way there, and we may confidently expect developments in the future never before dreamed of."

A GREAT LUMBER STATE.—Although the drain upon Michigan forests for 30 years past has been great, the State still maintains its pre-eminence among the lumber-producing States

of the Union. Out of 7,757,916,784 feet of pine lumber cut in the Northwest during the year 1887, Michigan produced 4,087,797,304 feet, or more than one-half the entire product, exceeding its product of 1886 by 103,000,000 feet. Out of 4,116,466,750 shingles cut in the Northwest, Michigan mills cut 2,770,164,750, or nearly two-thirds of the whole. The figures, large as they are, hardly convey an adequate idea of the piles of lumber which they represent. Leaving aside the posts and scantling, the Michigan product of pine lumber alone would lay a plank walk six feet wide and two inches thick around the globe at the equator, and erect an eight-foot board fence each side of it. The shingles, counting 1000 to the square of 100 feet, would roof over ten square miles of territory. In producing this number nearly 1000 mills, large and small, are operated. The capital invested approached \$40,000,000, and the value of the product at wholesale prices reached \$65,000,000. Aside from those engaged in shipping the product, the industry gives employment to over 35,000 men. During the year 58 sawmills and other wood-working establishments in the State were burned, and about the same number built or rebuilt.—*Detroit Tribune*.

STRAW LUMBER.—The reputation of American straw lumber has evidently gone abroad in the world. Among the items in an English exchange is a reference to an article that is by no means rare in this country, a substitute for lumber made of straw paper pulp: A house has been constructed in Philadelphia which is to be made entirely of lumber manufactured from straw by the pulp process. This house is to represent an American suburban villa, announced to be "handsome, and artistic in design," 2½ stories high, and covering a space of 42x50 feet. It is constructed entirely of materials manufactured from straw—foundations, timbers, flooring, sheathing, roofing, everything in fact, including the chimneys—the material being fireproof as well as waterproof. The inside finish is to be in imitation rosewood, mahogany, walnut, maple, ash, ebony, and other fine woods, the straw lumber taking perfectly the surface and color of any desired wood. This straw house is to demonstrate how far the inventive Yankee has succeeded, not in showing us how to make brick without straw, but how to produce timber from straw. If, after this brilliant exhibition of inventive genius we do not bow down and worship him as the "liker" of creation, we may consider ourselves lost to all sense of what is proper under the circumstances.

THE LUMBER EXHIBIT AT THE MECHANICS' FAIR.—The exhibition of lumber, from rough-barked trees to polished woods, at the late Mechanics' Fair was considered finer than at any previous exhibition ever held. The exhibits were sent in from all parts of the State. They included the largest single stick of lumber in the world, which is 151 feet long, 20 inches square in transverse section, and contains 5033½ cubic feet. In the Humboldt county exhibition there were two pine butts, one 6½ feet in diameter and the other 5½ feet. In the same exhibition there was a redwood plank 80 inches wide and 11 feet long. It is one of five similar planks cut from the same log. In the Sonoma county exhibit there was a hutt of the great "Mission" tree, under which 150 camp-meetings have been held near Guerneville. From Mendocino county a plank 66 inches wide, 3 inches thick and 12 feet long was on exhibition. Local dealers sent in upward of a hundred different varieties of wood, rough, stained, varnished and polished. No other State in the Union, and probably no other country in the world, can make an exhibit of such a variety of useful woods as California.

THE RAILWAY AND LUMBER BUSINESS.—Determined efforts are being made by the railways of the United States to push farther and farther into the forest regions of the great Northwest. The Chicago, Milwaukee & St. Paul Railroad Co. contemplates extending its line up the Wisconsin river, through the Gogebic mining region, to Lake Superior, together with a branch from the main line to the valley division at some point south of Wausau. This enterprise will greatly facilitate lumbering in a very important district. In Michigan, it is the settled policy of the Flint & Pere Marquette and Michigan Central Companies to lay down branches wherever much pine is to be reached. The former company baled last year no less than 134,000,000 feet of logs. Private logging railways are also increasing in number and extent throughout the country. A successful effort to establish rail shipments is in progress in the Saginaw valley. In 1880 that district sent out 27,000,000 feet of lumber by rail and 770,000,000 feet by water. Last year the rail movement amounted to 176,000,000 feet, and that by water to only 591,000,000 feet. The principal gain in the former direction has occurred since 1884.

THE EXPORT OF LUMBER, boards, deals and planks to Mexico, Central American States and the several countries of South America, from this country, continues to increase in value. During the month of January last, the increase in value of exports to Mexico was about \$8300. To the several countries of South America the increase in January last over January, 1886, was \$89,686. There was a slight decrease in exports of these goods in January last to the West India islands, as compared with January, 1886.

LUMBER IN CALIFORNIA AND FLORIDA.—How great the contrast between the lumber business in California and Florida! In this State hundreds of vessels are constantly engaged in the trade; indeed all the shipping suitable for such business that can be had on the coast, and new ones are all the time on the stocks and being built as rapidly as possible, and yet transportation facilities are short. A lumberman tells, in the *Ocala Banner* (a Florida paper) the following story of the utter demoralization of the lumber business in that State. This, of course, was months before the sad visitation to that State of the dread epidemic from which she is now suffering. The *Banner* said: "If every mill in reach of Ocala were shut down, and the teams turned to grass, the owner would be better off. We are selling lumber to-day worth \$20 per thousand at the mill for \$15 per thousand feet and paying freights; every man feels that he is in a 'catch-as-catch-can' tussle, and is doing the best he can. It is true that times are hard all round, and very little demand for lumber; but if that little were sold at what it is worth we would do far better."

THE RIVER PLATA LUMBER TRADE with this country has gained in importance during the last two years, in consequence of extensive railroad building in the Argentine Republic and the rapid increase of immigration. The shipments from the United States in 1887 comprised 76,000,000 feet of white pine, 53,500,000 feet of spruce, \$2,500,000 feet of pitch pine, and 8,360,000 feet of hard-woods. The United States needs and should have direct steam communication, regular mails and good banking facilities, and a great trade could be built up with the River Plata and other South American countries.

LOGGING IN HUMBOLDT COUNTY.—The Humboldt *Times* of a late date says: We learn from A. Bacon, general foreman of the Ryan Slough and Logging Works for McKay & Co., that last week was a busy one for the trappers, from the fact that it was the largest week's work done in the logging camp since it has been in operation, about 550,000 feet being deposited in tide-water.

SOUTHERN HARD-WOODS.—Large quantities of Southern hard-woods are crowding their way into Northern markets. Yellow pine is being shipped more largely every year, and cypress and sap are coming into more general use.

SAW MILL NOTES.

Care of Saw-Teeth.

Saw teeth should never be filed on the top side; they may receive a slight draw of the file to take off a feather edge, but good filers will never take off any metal from this part of the tooth. The roots of the teeth must, of course, be kept full, and this will naturally wear off a trifle each time from the top; but a good sawyer will preserve the line of the tooth to as great depth as he may venture to cut with a file before sending the plate to a gumming machine for spacing and recutting the teeth. It is becoming more common every day to do less filing in sawmills than was formerly thought necessary.

It is becoming more and more apparent that the steel is more valuable as a cutting medium than as a fine dust on the floor of the filing-room, and the adjuncts for keeping saws in order have of late years multiplied with rapidity.

Formerly all saws were given a spring set, and a notion prevailed that they must be set wide enough not only to clear the plate from the body of the log, but as well as to allow for the sawdust to pass from the top of the log through by the side of the plate. At that time but little thought was given to compacting the metal at the cutting point, in order to give it strength and greater solidity, and as the comparatively spongy cutting edges wore off rapidly, of course so much more filing had to be done.

When at last the fact dawned upon the mind that if the point could be made of greater density its wearing qualities would be vastly improved, it was no uncommon thing to see a sawyer sit down with a heavy and rough piece of iron, and hammer the point, spreading it while drawing it out. This was not eminently successful with many sawyers, not all of whom were expert enough to do a good job with the facilities which were within their reach. The amount of filing which was usually necessary after the hammering process was complete, was anything but in the interest of economy of saws or files.

Then came the ewage, a bar of steel about eight inches in length and one and a half inches in diameter at the large end, tapering to one inch or less at the small end, and having six or eight sides. This was of the best tempered steel, and it took a good workman to make it, and an equally good one to use it, while in a majority of cases it was the most expensive adjunct to the mill. Then the upset was invented. This is a tooth with jaws V-shaped, having a side collar which prevents the expansion of the tooth by the spreading pressure of the crown of the upper jaw, preventing the tooth from splitting while the metal of the point is compacted by driving inward, reversing the hammer and ewage process of drawing outward.

This tool has come to be pretty generally adopted, although it is difficult to find a man who does not declare his dislike to it, and if of an inventive turn of mind he is usually studying

some plan of improving it every time he sits down to use it. It is better than the swage in the hands of most sawyers of the present day, but it takes a long time to get around the circumference of a saw, and its use requires an expert. Its advantage is found in spreading the corners of the teeth to such an extent as to enable them to cut a kerf efficiently wide to allow full clearances for the saw plate in its passage through the log, without the necessity of any spring set in the tooth, while at the same time it compacts the metal and reinforces the full width of the cutting edge with an arch or shoulder, which gives strength to the point.

In the hands of an expert or fully competent man, the upset is probably the most valuable portable tool about the mill, if we except the monkey-wrench. One of the chief disadvantages, however, is found in its portability, it being necessarily too light to receive the blows of the hammer, which will compact the metal of the tooth properly without a rebound, which militates greatly against the uniform character of the work, and makes requisite a larger number of blows when one would accomplish the work to better advantage. Many inventors have racked their brains to overcome this trouble, but all have arrived at the same conclusion, that the tool which will do the work effectually must be too heavy to be portable.—*Wood and Iron*.

Great Sawmill Feat.

The Santa Cruz *Courier-Item* of a few weeks since recorded what may be considered a very extraordinary feat of lumber-sawing. According to the record, the Aptos sawmill turned out 143,000 feet of lumber from the logs in six hours.

The Aptos mill is situated on Valencia creek, near the sea-coast, and is owned by F. A. Hihn. It must be a thoroughly equipped and efficiently manned sawmill. The workmen had come to the conclusion that the powers of the mill and themselves had only been half drawn upon, and it was decided to put both to the test. That test commenced at 6 o'clock on the morning of the 14th of August. The giant logs were lifted from the pond and swung upon the carriage. The smallest did not measure less than a thousand feet of lumber, and many tallied as high as 1600, 1700 and 1800 feet. They were cut into boards, slabs and railroad ties, edged and taken care of as fast as possible. The scene was an exciting one. First, three of the logs were ground into slabs, boards, railroad ties, etc., in ten minutes. Then one that tallied considerably over 1000 feet went under the saw and came out mince-meat in a trifle less than two minutes. So it went, "without baste, without rest," till a halt was called, and the unprecedented record of 143,000 feet—sawed and stored from 125 logs in six hours—was declared amid rousing cheers. This feat was performed by 26 men, including foreman, engineer and fireman. Aptos mills challenges the State to beat this record. Does any mill dare to accept it?

In closing its article the *Courier-Item* says: The railroad took down to Aptos several thousand feet of the morning's product, which was duly shipped for Pajaro, en route to Coyote, whence it was ordered, and the next morning, in less than 24 hours from the time the lumber was in the shape of clumsy logs floating in Valencia creek, it was on the ground, nearly a hundred miles away, where it was to be used.

THE LARGEST SAWMILL PLANT in the South is now being erected at Brewton, Ala. The engine and much of the mill machinery is in position. The capacity of the mill will be 200,000 feet of lumber per day. It will give employment to over 250 men. This large mill is the property of the Peters Lumber Company of Manatee, Mich., and is situated on the line of the Louisville railroad. It went into operation August last.

SAWMILLS IN MICHIGAN.—There are nearly 1000 sawmills, small and great, in the State of Michigan, the largest lumber-producing State in the Union. The capital invested in these mills is fully \$40,000,000, giving employment to over 35,000 men. Fifty-eight sawmills and other wood-working establishments were destroyed by fire in that State during the year 1887, and about the same number built or rebuilt.

SAWMILLS INCREASING IN THE SOUTH.—It has been estimated that between 200 and 300 sawmills will be erected during the last six months of the present year in the Southern States. Pine land is being bought up both North and South, until it is difficult now to find a large tract within an easy distance of the market.

CALIFORNIA PETROLEUM.—About 400 barrels of crude petroleum are being turned out daily by the 22 wells of the Pacific Coast Oil Co. in the Pico district, near Newhall. The oil company has a monopoly of that section of the country, and it is said to have paid out from \$50,000 to \$100,000 to prevent any other wells than its own from being developed. The wells of the company are now sunk to a depth of from 1600 to 1800 feet. The oil is of the best quality obtained on the coast, and the demand for it is very great. Two more wells will be sunk soon. All of the product is shipped to this city. Many of the new manufacturers burn oil instead of coal, and as it has been proved to be perfectly safe under stationary boilers, where no great intensity of heat is required, its use in this line will no doubt be greatly extended.

COTTON AND WOOL.

Inferiority of American Wool to European Explained.

The reason why American wool will not make as fine goods as that produced in France and Germany receives this explanation in the Philadelphia Inquirer: The sheep-raising districts in this country are in cold sections; among the rocks and hills of Vermont, Massachusetts and in portions where the changes in temperature are sudden and the climate is severe. The very elements which give them health and make their meat delicious, detract from the quality of the goods spun or woven from the wool. In order to provide a suitable warm covering and protection from the inclement weather, nature provides them with a thick coat and their wool grows luxuriantly. The growth is aided by an oblongous fluid secreted in the skin, and when the wool is sheared small globules of a glutinous and a sticky nature are found adhering to the surface of the hairs. These are treated with strong alkalis to remove the excrescences; but the wool seems rough to the touch, altogether different from that manufactured in the southern cities of Germany.

Inspection of our cleansed wool with the microscope reveals ovals or crater-shaped protuberances still adhering to the hair. The alkali has destroyed the gluten, but not the hard bottom crust of the globules. Chemicals strong enough to remove these affect injuriously the crisp surface of the hairs. The epidermis is broken and destroyed in places, thus weakening the fiber and impairing the strength and flexibility of the wool. These manifest themselves in the dyeing. With all the care possible after the wool is woven into cloth there is a lack of that softness to the touch existing in the fine foreign product. The dyes will wear off first at the cup like excrescences and show a mottled appearance, and if the cups have been all removed will wear pale where the texture has been impaired by the removal. Thus American woolen cloth will not retain uniformity of color nor possess homogeneity of texture equal to the fine merinos of Germany. In order to test the matter beyond peradventure, not long ago one of our leading woolen manufacturers sent some of the best American wool to the most noted German manufactory, where it was subjected in the dyeing-house to exactly the same treatment as the German wool. The manifest difference in the outcome settled the question finally.

A New Material for Cotton Bagging.

Late advices from the East say that the emergency forced upon Southern cotton-planters by the exaction of the beggling "truet" has resulted in devising a cotton-cloth substitute for jute bagging for bales, specimens of which have been submitted to the members of the Cotton Exchange, and favorably received.

The material being made of the very commonest cotton, can be sold at a price lower than ordinary jute bagging. The manufacture of this material opens up a new and enlarged scope of usefulness for our cotton mills North and South, besides creating another factor in the consumption of the staple.

Still another cotton bagging material has been proposed. A bale of cotton was received in Washington a few weeks ago covered with pine-straw bagging. It passed all the tests satisfactorily, including that of compress. It is expected to answer all the purposes of jute bagging and can be manufactured at much lower prices.

In this connection it might be well to inquire why cotton might not be practically and economically applied to wheat bage, in place of jute. If that can be done another opportunity for trust combinations and hag corners will be swept out of the way, to the great benefit of the farmers on this coast.

In regard to the outrageous proceedings of the unprincipled "truet" combination, Andrew Gratz, a St. Louis member of the Cotton Bagging Trust, recently testified before the Committee on Manufactures that the trust made a contract with L. Waterbury, New York, who guaranteed 6½ cents per yard. Waterbury has advanced the price to 12½ cents per yard, and would have advanced it further but for his sympathy with cotton-growers—an advance of 100 per cent. It is to be hoped that the new material will be all that is expected of it. In such a case any "truet" combination would be impossible.

Cotton-Picking in India.

Carter Harrison, in a late letter from the cotton-fields of India, writes as follows:

Thousands of cotton-pickers were seen—the women, with their bright scarlet skirts and scarves, making the green fields look as if flecked with huge red flowers. The dress of the women is a cloth wrapped about the waist and falling nearly to the ankles, and then a scarf thrown over the left shoulder and caught below the waist under the right arm, leaving the right shoulder, arm and part of the back free and uncovered. When at work the skirt is caught up between the legs and fastened at the waist, making a sort of loose, flowing hippen. The laboring men and boys are nearly nude, with a short breech-cloth around the hips. I have become so accustomed to nearly naked people that

I have grown to almost admire it, and to consider this the least dress the best dress. I do not think I would now be at all shocked by the decollate costume of a belle in a fashionable ball-room in Europe or America. I have grown quite used to that sort of thing, and quote Thomson *con amore*:

Oh, fair undress, best dress! It checks no vein,
But every flowing limb to pleasure draws
And heightens ease with grace.

Frequently, as we passed near a lot of cotton-pickers, the younger ones would salute the passing cars. I noticed that my two boys invariably took the salutations of the girls as being made expressly for themselves. An oldish man relearns much forgotten human nature by traveling with two young boys.

The New Woolen-Mill at Woodland.

The new woolen mill at Woodland was recently visited by a reporter of the Yolo Mail. It was nearly ready to start at the time; the last installments of machinery had just been received from the East. The engineer, Homer Dutton, had steam up the week before and tested the driving-power of the mill. The engine worked like a charm, and he reports himself ready for business. The shafting is up and in perfect line throughout the mill.

On the lower floor the looms, ten in number, were in position waiting for their barnees, as were also the finishing and dressing machines. A wool dyeing apparatus of large capacity, to be used in winter time, is also complete. The main building and all its wings are of brick, except two sides of the boiler-room, which are of corrugated iron. The entire building is roofed with this material. The main building is 120x53 feet, and its walls are 28 feet high.

In order to pacify the insurance agent, the picker-room is built six feet from and independent of the main building. The floors of all the wings are laid in cement.

Mr. Walker, the general manager, is full of confidence and enthusiasm over the prospects of the mill. Everything has been done under his personal supervision, and he knows all will be right. He has been particularly careful in arranging for an economical and convenient working of the mill. He claims to be able to run it with a force smaller by ten men than mills of its capacity usually require.

There will be no Chinamen employed about the mill. "During the many years that I did business in San Francisco," said Mr. Walker, "I paid out hundreds of money to employes, but never a cent to Chinaman. Of course we shall have to have some experienced operators, but the largest number of the mill hands will come from families in Woodland. We shall employ 75 or 80 hands when well under way. My weavers shall be smart and nimble-fingered girls, who will be paid 'by the piece,' according to the number of yards they weave."

Mr. Walker is intensely practical in his ideas, and has not passed through a husy life without learning that the safest way is the best way.

"We are going to run this enterprise to win," he said. "We ain't going to have any high-toned, big-salaried officials around us, but we do propose to have the best skilled cloth-makers, and to put upon the market goods that will stand first in the market."

Mr. Walker said that the mill would start up as a "four-act mill," but its capacity would, he hoped, be doubled in due time, and the number of looms increased from 10 to 24.

The machinery there far purchased cost about \$12,000. It is all of the newest and most approved styles and patterns, and Mr. Walker can easily claim that for its size he has one of the best and most complete factories of its kind on the continent.

WHY CALICO WAS SO CALLED.—The derivation of this word is very interesting, as of such an ancient date is its origin. Mrs. Leonowens says in her "Travel in India" that in the year 1498, just ten months and two days after leaving the port at Lisbon, Vasco de Gama landed on the coast of Malabar, at Calicut, or, more properly, Kale Rhoda, "City of the Black Goddess." Calicut was at that period not only a very ancient seaport but an extensive territory, which, stretching along the western coast of Southern India, reached from Bombay and the adjacent islands to Cape Comorin. It was at an early period so famous for its weaving and dyeing of cotton cloth that its name became identified with the manufactured fabric, whence the name calico. It is now generally admitted that this ingenious art originated in India in remote ages, and from that country found its way to Egypt. It was not until the middle of the seventeenth century that calico printing was introduced into Europe. A knowledge of the art was acquired by some of the servants of the Dutch East India Company, and carried to Holland, whence it was introduced in London in the year 1676. It is surprising for grown-up children, as well as our young folks, to learn that "Pliny, as early as the first century, mentions in his natural history that there existed in Egypt a wonderful method of dyeing white cloth." Calico cannot be deceived when it boasts of such antiquity. The shoddy make-up of the present day may look down with contempt upon the calico dress; but what kind of lineage has it? the calico can proudly ask.

CHANGE OF BASE.—When the projectors of the Santa Rosa woolen-mill first opened that establishment, says the Sacramento Bee, 3500 to 4000 bales of wool found a market in that

town, but now not more than 50 bales are grown in that neighborhood. The disadvantages of having to look outside for wool, and then be compelled to make a market elsewhere also, thus losing no small sum in commissions to San Francisco middlemen, are apparent. Under these circumstances, the owners of the mill concluded that it would be more profitable to move the establishment to some more favorable locality. It was first proposed to go to Oroville or Red Bluff, but upon further canvassing the situation Sacramento was found to be a more favorable location. While very little wool is grown in that neighborhood, Sacramento is the chief market for wool in the interior, and shipments from Northern California have to go there first. Besides, it was argued that city would prove a fine market for the sale of much of the product of the mill. Thus Sacramento seems to overcome all the objections urged against Santa Rosa, while combining all of its advantages. Mr. Devlin is informed that the Santa Rosa people have determined to locate if the citizens will subscribe to one-half or one-third of the capital stock. The Oak Park Association has offered a block of land as a site. These mills, if secured to Sacramento, will employ 75 to 100 people, all white. The Santa Rosa mills have always paid 1 per cent per month upon the capital stock, and it is thought will do much better in Sacramento. The sum that would be needed to purchase say one-third of the capital stock would be from \$15,000 to \$25,000.

COMPRESSING WOOL FOR LONG HAULS.—The compression of wool for the purpose of lessening the cost of freight has a number of ways of solution. The usual compressed bale with iron hoops is a familiar object, but the compression of several sacks of wool together—the wool still remaining in the original package—is an innovation that has been in vogue only a short time. Montana wools are thus, to a considerable extent, forwarded to the Eastern markets at quite a saving in the cost of freight. At Fort Benton, Montana, a hydraulic press is stationed for the purpose of binding three bags together with iron ties so they shall not occupy more space than one and a half bags in their ordinary condition. The saving in freight on compressed wool is 45 cents per 100 pounds. No injury is done to the wool and its general good looks do not suffer to any appreciable extent upon its exposure in the lifts of the commission house or dealer. Very greasy wools thus treated might lose their former open appearance and sightliness when exhibited in the market.—*Cotton and Wool.*

OUR WOOL AND WOOL-MANUFACTURING INDUSTRIES.—The imports of woolen goods into the United States in 1879 were only 12 per cent of the total consumption. In other words, the domestic production of woolen goods was 88 per cent of the total consumption. In 1859 the domestic production was only 40 per cent of the domestic consumption. This illustrates, very forcibly, what protection has done for this industry. The production of wool has likewise made astonishing strides under protection. In 1859, the clip was 60,000,000 pounds, or 19 pounds per capita of population; in 1879, its clip was 232,000,000 pounds, or 4.8 per capita. Woolen goods are somewhat lower in England and other countries of Europe than here, but the American people buy and use more woolen goods every year than all the people in Europe put together. The reason is that they are better able to buy them. Matthew Arnold said that our prices are almost as low as they are in England.

WOOL GROWING NORTH AND SOUTH.—It is learned from the report of the Department of Agriculture for 1886 that during the previous year only 9,241,000 sheep were to be found in the 13 Southern States, one-half of which were in the single State of Texas; while 35,518,000 were credited to the Northern and Western States. Only about one-fifth of the whole number of sheep in the United States are found in the South. These statistics show why the free-wool proposition pinches so much harder North than South. The three Pacific Coast States, with Washington Territory, contained more sheep than the 13 Southern States—9,892,652 against 9,241,449. New Mexico has nearly as many sheep as Texas by nearly 2,000,000. These are the official figures.

BLEACHING WOOL WITH BISULPHITE OF SODA. The method of bleaching wool with bisulphite of soda, says Justus Muller, is unquestionably preferable to that of the burning of sulphur. First, no separate apparatus is required; and second, the fiber is bleached through, which is not the case with sulphur. The wool, as ordinarily, is scoured with soap, well rinsed and placed in bisulphite of soda of 20° Be., where it is left to lie for from 12 to 15 hours, after which it is passed in an unwashed condition through sulphuric acid of 4° Be.

"REFORMERS" say with one breath that the removal of the dnties on wool would give the people cheaper clothing and blankets, and in the next breath say that the price of wool is lower now (under protection) than it ever was under free trade or low duties. Oh, Reform, how many strange things are said in thy name!

SOFT WOOL is rapidly taking the place of starched lineo for many purposes.

STEAM BOILER NOTES.

A New Boiler Feeder.

In the minds of many engineers there is much objection to the use of either pump or injector as a boiler feeder, because the water is forced into the boiler against a considerable pressure. A Cincinnati engineer, John B. Winder, has sought to remedy this by a feeder from which the water simply runs into the boiler after it has been heated and purified, besides keeping the water at a predetermined height. The boiler is tipped at the height it is desired the water shall remain, the feed-pipe entering the boiler at this point. The feeder is connected with this pipe, and consists of a cylindrical receptacle adapted to contain about two gallons. A rod runs vertically through the center of the cylinder, and also through a float, which is free to move up and down on this rod, its movement being limited by two collars on the rod, one above and the other below the float. Upon the top of the cylinder is a double-armed lever, the two lever arms being connected by rods and crank arms, so that when the valve admitting water from the chamber to the boiler is open the valve admitting water to the chamber is closed, or vice versa. The rod running through the chamber boars against an S-shaped arm upon the top of the cylinder, which arm is rigidly connected to a weighted lever. If the water in the boiler is lower than the feed-pipe, steam will pass through said pipe and out under a cap into the water, forming a hot spray, which will seek a level in the boiler. The pressure thus being equal, the hot water will flow into the boiler automatically at the very instant that it goes below its proper level. When the water in the receptacle feeder has lowered so that the float rests upon the collar, the rod is drawn downward, and in so doing moves the S shaped weighted lever until it overbalances and falls upon the lever connected to the valve that admits water into the cylinder, thus opening this valve when the water is low in the cylinder, and, as they are connected, closing the connection with the boiler. When the cylinder is filled the float rises, and, striking the collar, moves the rod upward, thus raising the weighted lever until it again overbalances, and so closes the supply pipe to the cylinder, at the same time opening the valve leading to the boiler. The supply pipe need never be shut off.

For Use in the Engine-Room.

The average weight of anthracite coal is 9.35 pounds per cubic foot.
Coke (loose) weighs 23 to 32 pounds per cubic foot.

Bituminous coal weighs, per heaped bushel, loose, 75 pounds; one ton occupies 48 cubic feet.

One gallon, U. S. standard, contains 231 cubic inches; weight of water in same, 8.331 pounds; one cubic foot contains 7.4805 gallons of water.

The velocity of steam, of atmospheric pressure, flowing into a vacuum is 1660 feet per second; into air, 650 feet per second.

To find the pressure per square inch at the base of a column of water, multiply the height of a column in feet by .434.

To find the lap required on a slide valve to cut off steam at three-fourths stroke, multiply the stroke of the valve in inches by .250; the product is the lap in terms of the stroke. To cut off at two-thirds stroke, multiply by .259.

A GOOD FIREMAN NECESSARY.—Firing is only done properly when the fuel is consumed in the best possible way—that is, when no more is burned than is necessary to produce the amount of steam required, and to keep the pressure uniform. To attain this end, complete combustion must be obtained in the furnace, and this is going on when the fuel is burning with a bright flame evenly all over the grate. Blue flames, dark spots and smoke are evidences of incomplete combustion, due to lack of air. The best engineer in Christendom cannot produce the best result with his plant when he has to depend on an unskilled fireman, or upon himself, acting also as fireman. It is a common notion that anybody can shovel coal into a furnace, and that this constitutes all that a fireman needs to do. A great many cherish this idea without realizing how serious it is. No man ought to be placed in charge of a coal-pile who cannot tell approximately how much can be deducted from it, and its definite evaporative value. To speak plain, the coal-pile means just so many dollars worth of work. The duty of expending this money, this raw material, should be intrusted to a well-experienced and well-paid fireman.

BICYCLES DRIVEN BY STEAM is the latest novelty—oil is used for fuel, and it is claimed for them that there is no noise of escaping steam, or odor from burning oil. A speed of 10 miles an hour is easily attained on level ground, and enough fuel and water is carried for a run of 25 miles. The engine, boiler, and whole apparatus for a bicycle developing ½ horse power weighs 68 pounds, and is all carried in front and in sight of the rider.

It is proposed to build a 20 inch gauge railroad over the country between Prescott and Copper Basin, Arizona.

Flour Mill Notes.

The Starr Mills at Crockett.

A representative of the *Contra Costa Gazette*, who recently visited the immense flouring-mill of Starr & Co., at Crockett, writes as follows: Although no flouring machinery has been put up, a visit to the interior of the structure is not to be sneered at. In the engine-room a 200-horse power engine with a 25-foot fly-wheel furnishes motive-power for the wheat elevator, which is running steadily and elevating 10,000 sacks of grain per day. Power is transmitted to the elevator by long cables, which run at the rate of a mile a minute, and the elevator itself is constructed much like an old-fashioned pump, having buckets at intervals on an endless chain, which each lift ten pounds of wheat every revolution. At the bottom of the elevator is a large pit into which the wheat is dumped, and at the top, in the dome of the building, the wheat is delivered, after first being cleaned, into chutes, and conducted to various bins, where it is ready to be resacked for shipment. The process is simple and very interesting, and a most effective manner of getting the cereal into the upper story.

There are upward of 50 men employed about the mill at present in handling wheat and working about the engine-room, but when the mills once get into active operation in the manufacture of flour their force will be swelled to an army, and many new residences will grace the hillsides about Crockett and Valona. Many thousand sacks of wheat are awaiting shipment and vessels are continually being loaded for Liverpool. A branch railroad track runs into the warehouses and the deepest water vessel can lay alongside of the wharf to receive cargoes. The site of the mill is well chosen, and when the large machinery is placed and the mill opens up, an industry will be started that will be a material aid to the entire county.

BARLEY-GROWING IN INDIA.—The government of Madras is putting forth a special effort to encourage the growing of barley on the hills. They have issued instructions for a memorandum to be prepared detailing the description of barley required for malting purposes, and stating the method in which it can be best grown and prepared for the market. They have also intimated to their civil officers that no opportunity should be lost of impressing upon the ryots the great advantage which will result to them in the way of obtaining a ready and remunerative market for grain, if carefully grown and prepared. That the experiment will ultimately prove a success if energetically pushed there can be no reason to doubt. Last year the exports of Punjab barley from the port of Bombay amounted in value to eight lakhs of rupees, and of this three-fourths came to the United Kingdom. This trade has sprung up only in the last year or two, but it now shows every chance of proving an important and thriving industry. —*Albany Journal*.

THE MILL-BUILDING AND MILL-FURNISHING BUSINESS in the Western States is by no means as depressed as was predicted earlier in the season. New mills, says a Western cotemporary, are being built in almost every section of the country, and old machinery is being replaced by new, etc. There is not a flour-mill in operation in the whole country but what is daily calling on manufacturers and dealers in the class of goods they use for something, and the aggregate is simply enormous. It is true that some of the large establishments have the lion's share of these orders, for they have expended a great deal of labor and money in making themselves well known to the millers, both through their advertisements of various kinds and their traveling men, but the smaller dealer is also reaping his share of orders, and nearly all, as we have heard, are fairly well satisfied with the year's work so far, while some have undoubtedly sold more machinery than in any previous year.

MOROCCO AS A WHEAT-PRODUCING COUNTRY. A comprehensive report is given by Consul White on the resources of Morocco as a wheat-producing State. Mr. White speaks of the country as "a land with a future, a land now lying fallow, but which, in past centuries, exported large quantities of grain to Rome, and which will, at no very distant date, we must hope, supply an abundance of corn to the over-populated countries of Europe." Comfort will be obtained if Mr. White will bear in mind that there is no hurry, as the over-populated countries of Europe have been supplied for years with a superabundance of corn, and it will be well to hold Morocco in reserve as one of the many "future granaries of the world," till the population of the United States has become large enough to consume all the wheat grown in that country.

SUPPORT YOUR OWN INDUSTRIES.—A San Diego paper recently uttered the following very justifiable plaint: San Diego has one manufacturing establishment of which she should be proud—the Coronado flouring-mills. But she is not—at least the mills are only making 2000 barrels a week when their capacity is 5000 barrels weekly. The reason is that San Diegans are so unpatriotic as to sell more than 3000 barrels every week that are made elsewhere and imported, and the San Diego flour is confessedly as good as that made anywhere. San Diego

should get well shaken up until she will patronize home manufactures to the exclusion of any other place. Only so can she hope to permanently thrive.

ENGLISH AND AMERICAN FLOUR.—The English millers can only compete successfully with American flour by having a good supply of cheap Russian wheat for giving strength to their flour. English wheat for flavor will have rather a rough time of it presently, but will be able to hold its own if a good supply of Australian can be bought at a cheap rate. Some large London millers have already been obliged to shandon English for American wheat, which is the nearest approach to "the flavored wheat" of any grown out of England.

GAMBLING IN GRAIN.—Several Australian millers are stated to have lately joined in a petition to the Government asking that means may be taken to put down the gambling in grain, of which the Vienna Corn Exchange is said to be the theater. The petition sets forth that this gambling is not only injurious to public morality, but that it inflicts direct injury on the milling trade by subjecting their staple raw material to sudden and artificial fluctuations in value.

THE WHEAT DEFICIT IN FRANCE.—The United States Consul at Marseilles, France, states that the French wheat crop this year is estimated at 250,000,000 bushels, and that the requirements of France from other countries the coming year will amount to over 70,000,000. The consumption of wheat in France in late years has averaged about 330,000,000 bushels, annually, for all purposes. The area planted is about 17,000,000 acres.

FLOUR-MILLING IN THE SOUTH.—The Southern States are fairly waking up to a new life in almost every class of industry. It is said that 72 flouring-mills were built in the Southern States during the first six months of this year. This increase in industrial occupations will soon give our Southern brethren so much of other things to think about, that the politicians will be unable to keep up a "Solid South," as that term is now understood.

FLOUR-MILLING IN BALTIMORE.—The *N. Y. Commercial Bulletin* and the *Baltimore Journal of Commerce* have got into a dispute over the flour production of Baltimore. Unfortunately, it seems that Baltimore has a greater milling capacity than there is any present demand for, as several mills are reported idle. Idle mills are, however, by no means confined to Baltimore. They are to be found, at times, in all sections of the country.

THE EXPORTS OF FLOUR FROM THE UNITED STATES during the 12 months ended June 30th were the largest on record, viz.: 11,747,028 barrels, exceeding the total of the previous year, which was 11,329,049 barrels. In 1885-86, 8,070,504 barrels were exported, and in 1884-85, 10,373,724 barrels. About 2,500,000 barrels are shipped to the West Indies, China, the Brazils, etc., the balance finding its way to Europe.

THE WHEAT CROP OF MINNESOTA AND DAKOTA this year will, it is said, aggregate the immense quantity of 100,000,000 bushels. Allowing an average of 400 bushels to the car, this will represent no less than 250,000 carloads, or 8333 trains of 30 cars each! This shows that the railways of that region will have a prodigious amount of traffic to handle within the next few months.

A GREAT WHEAT MARKET.—The receipts of wheat in Minneapolis for the crop year ending August 31, 1888, were 47,109,490 bushels, against 39,278,380 bushels last year. This is the largest quantity of wheat ever received in any primary market in the world. It exceeds the whole wheat crop in Minnesota in 1886.

STATE MILLERS' ASSOCIATION.—The regular annual meeting of the Pennsylvania Millers' State Association will be held at Lewisburg on Tuesday, October 9th, and from the present outlook there will be a large attendance.

AUSTRALIAN AND NEW ZEALAND MILLS are being rapidly remodeled to the roller process. It is said that fully one-third of the mills in operation in those distant lands are roller-mills of modern construction.

A LARGE WATER STORAGE.—Towle Bros. are building a new reservoir in Lake Valley, 17 miles above Towles Station, for the purpose of storing water to run their pulp-mill. The reservoir will be nearly two miles long. It will be fed by one of the tributaries of the North Fork of the American river, and will store about 150,000 inches, while about 300,000 inches flow through the valley in a year. About 130 men have been working there all summer building an embankment 50 feet high and 500 feet long. From the reservoir the water will come through the old Cedar creek ditch to the pulp-mill, where 1200 inches a day are needed, but it will be necessary to use this stored water only from the 1st of July until the fall rains. The capacity of the pulp-mill is 50,000 pounds of green pulp a day, and hereafter it is proposed to run it the year round. This new storage enterprise is also stirring up the Colfax people to the fact that it is their opportunity for getting a supply of water.

Coast Industrial Notes.

THE SUTTER CANNERY.—In the labeling department at the Sutter cannery one of the employees has labeled as high as 8000 in one day. Superintendent Pratt challenges the State to produce any one who can better this record.

A TOLL ROAD.—The contract for grading the toll road from Glen Alpine Springs to the Mendocino county line has been let to J. P. Long, who was the lowest bidder. He has already commenced work and will push it through as rapidly as possible.

LIME IN SAN BERNARDINO COUNTY.—In the Mojave valley, about 50 miles north of San Bernardino, there are eight large lime-kilns perpetually burning, each having a capacity of 500 barrels of lime per day. The Oro Grande lime has supplanted Eastern lime, and is now sold in San Diego, Los Angeles, San Bernardino, Pasadena, Santa Ana and Escondido.

SANTA CLARA'S INDUSTRIES.—Santa Clara county is looming up as an industrial section. The woolen-mills at San Jose are well known throughout the Pacific Coast, and their blankets and cassimeres find a ready sale in the Eastern markets. A brewery in that town is one of the largest in the world, doing an extensive export trade with the islands of the Pacific, the Eastern States and elsewhere. There are nine fruit canneries in the county, five being located in San Jose. Santa Clara county now exports more canned goods to Eastern markets than any other county except that of San Francisco.

SPECKLES' TWO SUGAR REFINERIES.—The *Watsonville Transcript* of the 15th ult. says: Mr. Speckles, who arrived in town on Saturday evening, says that his Philadelphia sugar refinery will be in active operation by May or June next. He is as confident as ever regarding the great future of the beet-sugar industry in this country, and says that in a few days the Watsonville works will commence operations. Owing to the fact that the beets were not planted until late in the season, only 350 tons per day can be obtained, the works having a capacity of 700 tons.

CREOSOTE WORKS ON SALMON BAY.—A large plant is being put up on Salmon bay, just north of Seattle, for creosoting piles for wharf building. The works, it is said, will cost \$125,000, and will be ready for operation in about three months. The company's capital is fixed at \$1,000,000. The collapse in the Eastern & Lake Shore trestle work along Elliott bay last spring when the engine was submerged, showed how quickly the dreaded toroedo destroy piling, and so far the only preventive that has given general satisfaction is creosoting, which is strongly indorsed by engineering authorities. The capacity of the works will be 100 piles every 24 hours.

BAY CITY MILLS, OAKLAND.—The Bay City mills, owned by Samms & Westphal, located on First and Clay streets, Oakland, is the largest of any of the kind in the city. The mill and warehouse cover almost an entire block. The buildings and machinery are valued at \$70,000, and at present the amount of grain on hand is worth \$35,000. The mill has a capacity of 225 barrels of flour a day, and to do that amount of work, 35 men are employed, whose wages range from \$2 to \$6 per day. The payroll is about \$500 per week. The mill is kept running night and day to fill the demand, except for the past few days, when it was shut down to repair the machinery. It will begin operations shortly and will run to its fullest capacity.

RAILROAD IMPROVEMENTS.—The *Placer Republican* says that a summing up of the loss of snowsheds by fire this season shows a total of 4300 feet between Blue Canyon and Truckee. Nearly all of it is being replaced, but there are one or two cuts where the railroad company thinks it can keep the track clear with rotary plows. Some of the new steel rails for this division are now arriving and are being stored at Emigrant Gap. Enough rails to lay 40 miles of track have been ordered for the mountains above Auburn. They weigh 76 pounds to the yard—16 pounds heavier than the rails now in use. It will be necessary to have a steam curving machine to lay them, and when that arrives they will be put down as fast as new track is needed.

DEVICE FOR TRANSPORTING WOOD.—We take the following item from the *Sierra Tribune*, published in Sierra City, this State: On the mountain south of the river a party of Italians have rigged up a device to transport wood from the top of the hill to this side of the river. It is simply a wire rope fastened stationary at both ends and suspended in the air. The wood is fastened together in bundles by means of small branches of hard wood and a hook is formed in the same manner. The wood is attached to the wire with the hook and then in the wink of an eye the thing is landed at the bottom. This means of transportation is in general use in Italy and therefore it ought to work here.

MACARONI AND VERMICELLI.—The number of macaroni and vermicelli factories in this city has increased until there are now seven establishments of the kind here. They employ about

75 men and boys, who are paid from \$1 to \$3.50 a day, according to the class of work in which they are employed. There are now made here upward of 250,000 boxes of macaroni and paste annually, in which about 10,000 barrels of flour are consumed. The same kind of wheat raised in Italy for macaroni manufacture is also raised, of equally good character, in this State, and made into flour for the same purpose. The macaroni turned out here is pronounced by connoisseurs to be as good as any made elsewhere. The horse-power of the engines used in macaroni manufacture here aggregates only about 150, much of the work being done by hand. The value of this year's product is estimated at from \$150,000 to \$200,000.

A NEW SOURCE OF BUILDING STONE.—A company with a capital of \$100,000, says the *San Diego Union*, has been organized for the purpose of quarrying the stone on Coronado islands, which are about 20 miles from that city. The brown sandstone found on these islands is of exceptionally fine quality. Being composed of silica, alumina, lime, magnesia and iron, it is said to be particularly well adapted for ornamental and statuary work, while the presence of magnesia renders it almost impervious to the action of the weather. On the smaller island alone there is fully 58,000,000 tons of this stone, so that the supply may be said to be almost inexhaustible. This stone is said to be equal to the best on the coast, and can be worked on a good commercial basis, and shipped with advantage to every part of the State. Samples taken out and tested show that, notwithstanding the durability of its nature, it can be worked with ease at a cost which will not exceed that of any stone of its kind in America.

JUDSON IRON WORKS.—The Judson Iron and Nail Works at Emeryville, or Berkeley, is a very large institution, and gives employment to a great number of men, boys, and girls. The men and boys work in and about the shops, some being skilled mechanics and others assistants and laborers. The girls are employed in lighter duties assorting and boxing the nails. On an average the establishment employs 475 people, whose pay ranges from \$1.50 to \$4 a day, and the expense for salaries alone will aggregate about \$18,000 a month. The buildings of the various departments cover an area of 13 acres, the rolling-mill being the largest. A specialty is made of boiler iron, bridgework, castings, machinery, tanks, and nails, and shipments of from 40 to 50 tons are made daily. About 100 tons of material is worked up. The whole of the machinery used in the works is made by them. Work has been rather slow in the past few weeks, and nothing out of the usual order has been done. The trade they supply is mostly through San Francisco, Sacramento, San Jose and Stockton.

NEW RESERVOIR.—The *Placer Republican* says: Towle Bros. are building a new reservoir in Lake Valley, 17 miles above Towles Station, for the purpose of storing water to run their pulp-mill. The reservoir will be nearly two miles long and is on Sections 35 and 36 of T. 17 N. R. 12 E. It will be fed by one of the tributaries of the north fork of the American river, and will store about 150,000 inches, while about 300,000 inches flow through the valley in a year. About 130 men have been working there all summer, building an embankment 50 feet high and 500 feet long. From the reservoir the water will come through the old Cedar creek ditch to the pulp-mill, where 1200 inches a day are needed, but it will be necessary to use this stored water only from the 1st of July until the fall rains. The capacity of the pulp-mill is 50,000 pounds of green pulp a day, and hereafter it is proposed to run it the year round. This new storage enterprise is also stirring up the Colfax people to the fact that it is their opportunity for getting a supply of water. Its use at the pulp-mill does not diminish its volume, and here is an unlimited supply of water which may be had by bringing it from Gold Run down.

PACIFIC IRON & NAIL WORKS.—At the Pacific Iron & Nail Co.'s Works, First and Market streets, Oakland, from 175 to 250 men and boys are employed, and the monthly payroll is about \$20,000. Laborers are paid from 75 cents to \$2.50, and skilled mechanics from \$3 to \$6 per day. The company imports the steel plates used in making steel nails direct from Belgium, England and Scotland, and get scrap iron from all parts of the world. Most of the coal used is from Australia, and 10,000 tons had just arrived. There is now stock on hand about ten months' supply of coal and material. All the locomotives, cars and schooners used in transporting the materials and products are owned by the company. The Pacific Coast trade is supplied by them through agencies in Salt Lake City, Los Angeles, Portland and San Francisco. The company is continually making improvements and will shortly begin the erection of a \$60,000 wire plant on the site formerly occupied by the old glassworks, and it will be in operation in about 60 days. The manufacture of wire will become a prominent feature of these works. This new department will necessitate the employment of about 60 additional men. For the number of days worked, the amount of work produced, and the money paid out, the company could be classed as the heaviest manufacturers in Oakland.

Something About Elevators.

NUMBER II.

There are very few buildings which an elevator of one kind or another would not increase the rental value of; even a block and a fall is preferable to the old style of carrying heavy goods up and down steep flights of stairs. That an elevator is indispensable to any building which is to be used for merchandise, offices, hotels or factories, etc., is proved by the fact that it is very rarely such a building is now erected without one.

By the use of a power elevator the objections to great height in office-buildings, hotels, etc., are completely obviated, and the upper floors are thus for many purposes made even more desirable than lower ones, as complete seclusion and quiet are particularly acceptable to lawyers, architects and others whose business does not require display. Hence in buildings which are provided with quick, easy-riding, safe and reliable passenger elevators, an active demand for rooms invariably exists. In purchasing an elevator, whether for freight or passenger traffic, next to the question of class should be the quality, price, durability, economy and safety, etc. There are in this business, as in most others, some worthless imitations which will assuredly prove costly and an ultimate cause, sooner or later, of disappointment.

Our illustration shows Messrs. A. J. McNicoll's & Co.'s patent hydraulic elevator. In this patent any number of ropes may be used, and the strain on all will be perfectly equal; if one breaks the others will hold without it, and it can be repaired at leisure. The spiral grooves in the drum are made in pairs, so that the pairs of ropes from each pulley will be close together when the yoke is farthest from the drum, and will coil outward from each other so as to lie nearly parallel.

The elevator pulley is secured to this drum shaft, and consists of two different sized wheels provided with a device for shifting the rope which hoists the cage, so that for light loads the rope may be coiled upon the large pulley and thus hoist the cage to its highest point with a movement of the piston through only a small part of the length of the cylinder and a consequent decreased supply of water.

When a heavy load has to be raised, the rope is allowed to coil upon the smaller pulley and the piston then traverses the full length of the cylinder.

The pipe by which the water escapes from the cylinder has a patent relief valve, and the pipe of the valve itself has an extension which draws up any water which leaks into the tank in the manner of an injector.

The doors on this elevator cage are worked automatically, which prevents the danger of their being opened at improper times, while they are always opened when the cage arrives at the landing.

The safety attachment is unlike that of other makers. Heretofore it has been the practice to connect the hoisting rope with the meeting ends of the levers, so that the pull of hoisting the cage would draw them up and keep their pointed outer ends inside of the upright timbers; but this rendered the operations of the dogs uncertain, as the rope would often break on the opposite side of the suspending pulley, in which case the spring would not be able to overcome the weight of the rope, and even when the rope broke close to the cage the weight of the rope would be sufficient to prevent the working of the dogs.

Mr. McNicoll's patent consists in compressing the spring and securing the meeting or jointed ends of the dogs in their set position by means of a hinged pin or latch.

A wheel is mounted upon the cage so that its rim will bear against one of the two upright guide timbers between which the cage moves, so that the travel of the cage and the friction of the wheel-rim moving against the upright timber will cause the wheel to rotate with a speed corresponding to the movement of the cage.

To prevent unpleasant vibration and insure smooth running, a wheel is also placed at the opposite end of the timber so that it will press against the opposite upright guide timber. The faces of both these wheels are covered

Nicoll's patent elevator cage in position ready to leave the landing. On the top can be seen the two hoisting cables, the balance-weight ropes and patent double-acting safety catch. Any further information may be obtained from the proprietor of the patents, at the works of Messrs. A. J. McNicoll & Co., 118 Main St., San Francisco.

Messrs. McNicoll & Co. also manufacture a patent hydraulic store elevator, a worm-gear belt elevator and a hand-power and sidewalk elevator, besides a large number of direct-acting vertical pipe rams, with many important and modern improvements.

The new air compressor being erected at the Anaconda mine, M. T., is said to be the largest

work of late. The Hazleton boiler, which this firm has introduced so successfully on this coast, has kept this department of their works running with full force since the beginning of the year. The 800-horse power plant of the Spring Valley Water Co. pumping station at Belmont has just been completed and put in successful operation, as has also the 600-horse power plant of the Pacific Coast Sugar Co. at Alvarado. One hundred-horse power boilers have also recently been furnished to the California Wire Works, the boot and shoe factory of Buckingham & Hecht and Frank's tannery at Redwood; also a number of smaller boilers for various mines in Mexico and Central America.

In the way of mill machinery, these works have under construction a 60-stamp mill for the Amador mine, in Amador county; power to be supplied by four Pelton water-wheels. A No. 4 Gates crusher of capacity of 200 tons per day is also a part of its equipment. There seems to be a large and growing demand for this crusher. Though only introduced on this coast some six months ago, numbers are already operating in various parts of the country with very satisfactory results. It is claimed that the capacity of a mill is largely increased by their use, from the fact of their fine crushing, thus relieving the stamps of their heaviest work.

Pelton Wheels.

The Pelton Water-Wheel Co., now located at 120 First street, reports a very active business in their wheels, many orders coming from South Africa, England, Australia and other distant localities, as well as from all parts of this coast.

The system of electric transmission, now coming into so general use, greatly enlarges the scope of operations, making it possible to use water-power over a large extent of country, where either from lack of head or other insurmountable difficulties it could not heretofore be availed of. The great economy, as well as the many other advantages of water-power in mining operations, are beginning to be better understood, and it will everywhere be more largely availed of hereafter.

Agricultural Title to Mineral Lands.

NUMBER III.

There is another class of agricultural settlers on mineral lands, who do more harm to the mining interests, and so to the general prosperity of the country, than those who fraudulently acquire title in order to mine or sell for mining purposes.

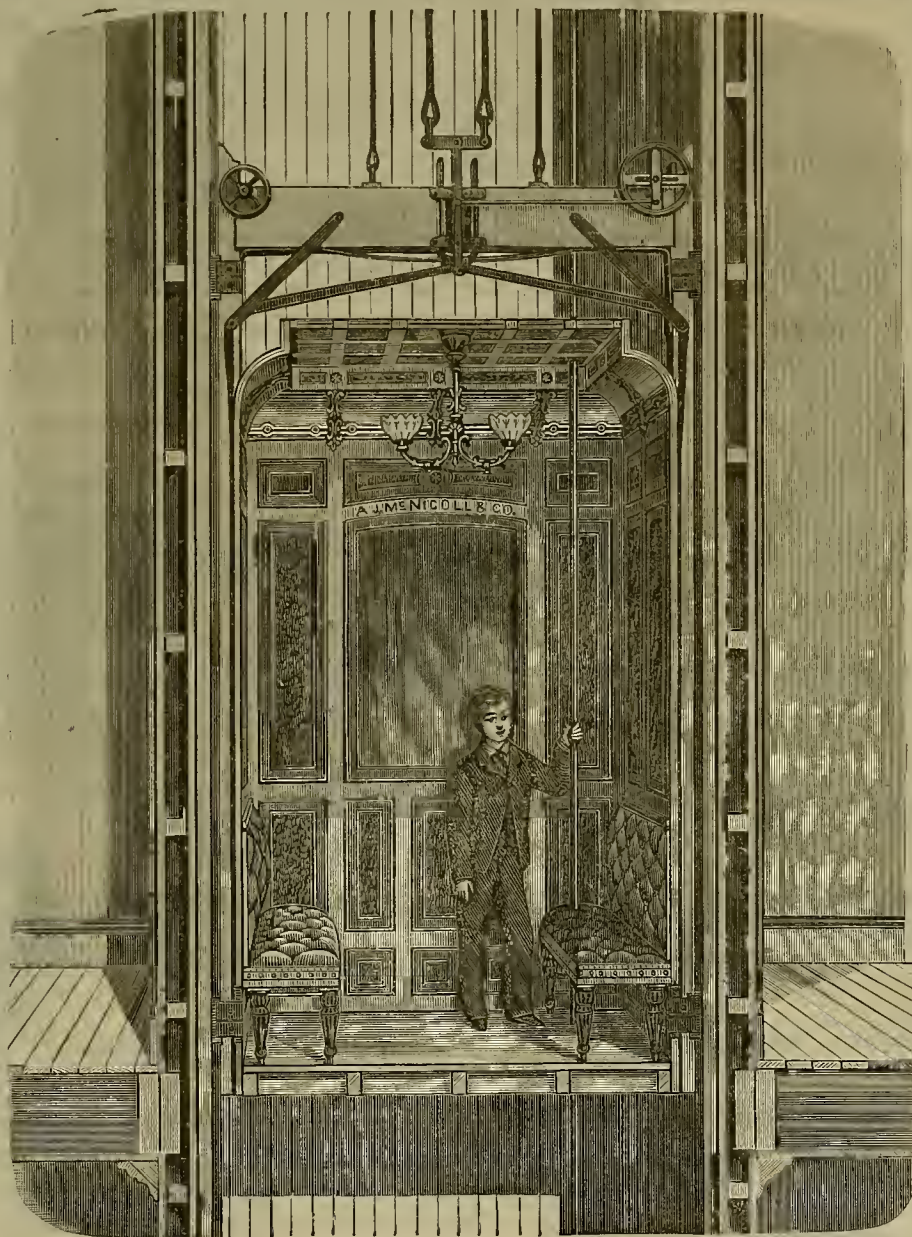
This is the class that merely takes up the 160-acre homestead because they practically get the land for nothing. Perhaps not over 10 acres at most in each homestead is fit for cultivation. The rest is mountainous and only valuable as mining ground, but the owners never attempt, themselves, to mine (unless it be for wages), and the land once passed out of the public domain is shunned by the prospector. Thus much valuable land is absolutely wasted, though unquestionably it is of great interest to the entire country that lands containing the precious metals be reserved for mining purposes, and all legitimate encouragement be given to mineral development.

Many instances could be cited where the rulings of local land offices are oppressive in discriminating against the miners, though why the mining laws should be interpreted in the interest of a class who ostensibly have nothing to do with mining, it is difficult to see. It is undoubtedly the intention of the law to protect mining ground for mining purposes, and at least such safeguards should be applied as will promptly stop the frauds now practiced and not throw the burden of protecting the public domain upon individual miners, who in so doing must suffer great expense in the manner which has been explained in previous articles.

In investigating the workings of the present mining laws in California, two things are clearly seen:

1st. The laws, as at present interpreted in the local land offices, make it far less difficult and expensive to acquire title to 160 acres of mineral ground by homestead or pre-emption than to acquire title to only 20.65 acres of the same character of ground by means of a mining patent.

2d. The laws should be such as to make the acquisition of mining titles more simple and expeditious and less expensive than now. This could be done, and at the same time the Government receive double or more per acre than at present. Whatever can be done in this direction cannot fail to stimulate mining, add to the output of the precious metals, and so be of benefit to this State and to the entire country,



A. J. McNICOLL & COMPANY'S PATENT HYDRAULIC ELEVATOR.

with india-rubber to increase friction and insure rotation.

The wheel on the right-hand corner [see illustration] is constructed with one or more radial slots; in each slot a weighted arm is suspended. The jointed ends of the dogs are connected with two guide rods which pass through eyes on the side of the crossbeam. Now, when the cage moves at its ordinary or proper speed, the wheel will rotate at a corresponding rate of speed, and the hinged arms will drop to the center as they are carried around the upper half of the wheel, and drop toward the circumference as they pass the lower half. They thus miss the projection on the lever, but should the rope break, or should the cage attempt to move downward at an unusual rate of speed, the increased rotation of the wheel will cause the arms to fly out and strike the projection and force it to one side, thus unhooking the latch so that the hinged bolt will swing down and free the dogs. The spring will then force the dogs down so as to dig their outer sharpened points into the guide timbers and thus stop the cage.

Our illustration shows the interior of Mc-

nicoll's patent elevator cage in position ready to leave the landing. It occupies a space 25x60 feet. The fly-wheel alone weighs 30 tons, and each of the hack cylinders weighs 16,250 pounds. It is placed on a solid foundation of granite 12 feet deep.

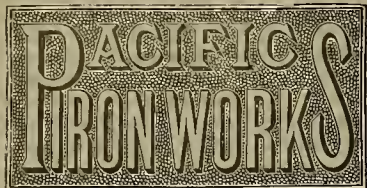
Foundry Notes.

The Risdon Iron Works have cast three of the 15 cast-iron columns for the tower of the New City Hall. These columns are 35 feet long and weigh 30,000 pounds.

In the erecting-shops are the compound Corliss engines for the Los Angeles Cable Railroad Co., more powerful and more economical in working than any of the driving engines of our city roads.

The new engines and Corliss for the steamship Australia will soon be under way. The boilers are for 160 pounds working pressure and the engines triple expansion. The Risdon Iron Works have guaranteed an increase of 2½ knots per hour in the Australia's speed on a coal consumption of 12 tons less than now being consumed.

The Pacific Iron Works have been turning out an unusual amount of mining and milling



1850. 1888.

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We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., of any DESIRED CAPACITY.

THE HAZELTON BOILER

Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

IT IS UNEQUALED FOR SAFETY, ECONOMY AND DURABILITY.

A Saving in Fuel of at Least 20 per cent Guaranteed over any other form of Boiler.

SEND FOR CIRCULAR.

PACIFIC IRON WORKS,

Sole Manufacturers for the Pacific Coast,

127 FIRST ST., SAN FRANCISCO, CAL.

WM. H. TAYLOR, President.

R. S. MOORE, Superintendent.

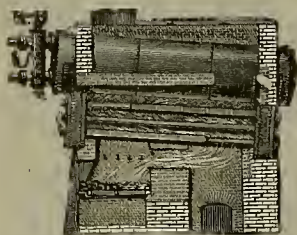
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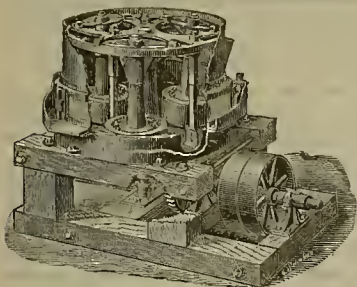
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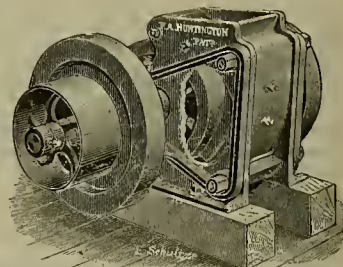
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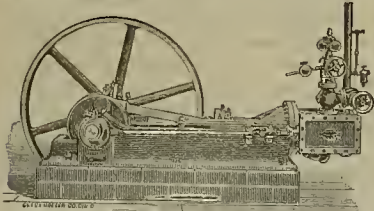
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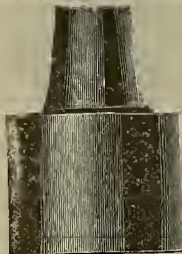
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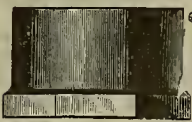
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Or Boiler Compound

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PLATINUM
FOR ALL
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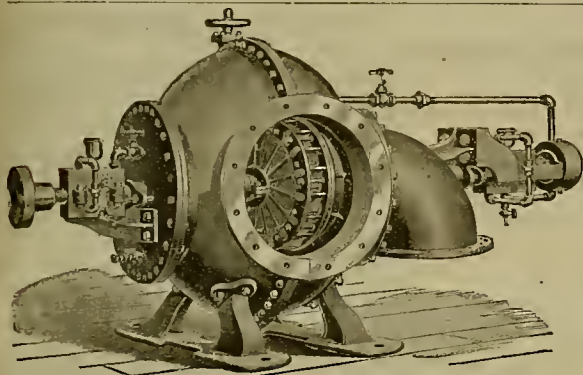
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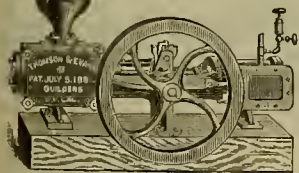
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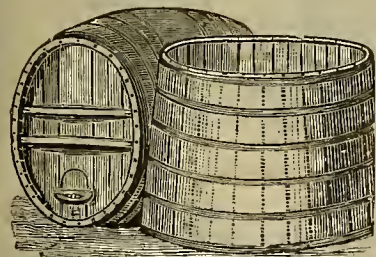
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Steam Pumps, Steam Engines
and all kinds of MACHINERY.

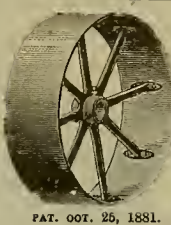
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Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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63 & 65 First St., cor. Mission, San Francisco.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

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Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

Near First and Market Streets, S. F.

C. A. LUCKHARDT, Manager.

ESTABLISHED 1869

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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METALLURGICAL WORKS.

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Ores Sampled and Assayed, and Tests made by my Process.

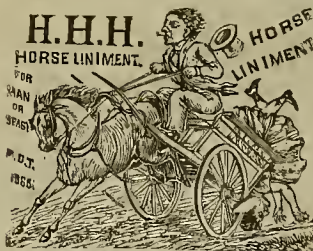
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THE H. H. H. Horse Liniment puts

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For the last 14 years the H. H. H. Horse

Liniment has been the leading remedy

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cure of Sprains, Bruises, Stiff Joints,

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and for Family Use is without an equal

for Rheumatism, Neuralgia, Aches, Pains,

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The H. H. H. Liniment has many imitations,

and we caution the Public to see

that the Trade Mark "H. H. H." is on

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Engraving Samples.

Send 2-cent stamp for 16-page fine illustrated samples of Photo-Facsimile, Photo-Zinc Etching and Wood Engravings (Proof Sheet No. 3) to DEWEY ENGRAVING CO. 220 Market St., S. F.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Oct. 11, 1888.

SILVER—The market in London and in New York has ruled easy throughout the week. The demand abroad was good in last month, but it is now said to be only fair for the season. In our market trading has been light; buyers bid down, but holders, so far as we can learn, do not entertain any bids below 94c. At the latter figures some transactions are reported for export. Since the shutting down of the mills in Virginia City, Nevada, that were running on ore from the Savage, Hale & Norcross and Confidence mines, the receipt of silver fell off, but with an increase at an early day in the supply of water in the Carson river the mills will be again in full operation, when silver from that section will begin to come in more freely. It is claimed by those in position to know that the work going on in several of the leading mines on the Bonanza lode is of such a nature that it will undoubtedly develop the positive existence of a lode to the west of that now being worked. This lode, called the Red lode, is chiefly if not entirely gold-bearing, which with further work calculated to take out ore will have an important bearing on the mining and silver industry; for gold instead of silver will largely predominate and new mines come to the front as large producers. In British Columbia, Montana, Idaho, Arizona and Colorado there has been no material increase in the silver output, but from Mexico more bullion has been received in this country.

The following table shows the amount of silver bullion in the principal European banks Sept. 20th, and at the corresponding date last year:

	1888.	1887.
Banks of France	\$49,234,560	\$47,829,794
Germany	15,646,000	15,606,000
Austria-Hungary	15,330,000	14,488,000
Netherlands	7,703,000	8,168,000
Nat. Belgium	1,271,000	1,250,000
Nat. Italy	1,116,000	1,101,000
Totals	\$90,199,560	\$88,469,794
Totals, previous week	\$90,649,296	\$88,644,448

The above shows an increase of nearly \$9,000,000 during the 12 months, with the Bank of France being the chief gainer.

QUICKSILVER—The market shows another slight decline, with a weak tone at the close. In last month the price here ruled at \$37.25 up to the 10th, when in sympathy with an upward move abroad it was advanced until by the 14th it reached \$45, at which price it continued through the month. The heavy shipments, 11,229 flasks, in last month was the leading feature of the export movement. China's fresh purchases were probably due to this market being \$2 a flask below the London parity. The receipts of California quicksilver at this port last month aggregated 2330 flasks, and for the first nine months of the year 19,236, against 17,949 flasks for the like time in 1887. From January 1, 1888, to Oct. 1, the exports in flasks were as follows: To New York, 2320; Mexico, 4253; China, 3536; New Zealand, 276; Central America, 323; Japan, 10; British Columbia, 8; Australia, 25. Total, 11,021 flasks against 9999 flasks for the like time in 1887.

IRON—Imports since Jan. 1, 1888, aggregate as follows: 1095 tons American pig and 14,000 tons English pig. Besides the above there were received 7500 tons of old railroad iron, 1050 tons of nail slabs and 9474 tons of scrap. The market continues strong under a good consumptive demand. The imports go into consumption about as fast as received. Scrap iron is reported very strong at \$26.

LEAD—The New York market, the past week, was subjected to lively fluctuations, with prices gravitating to lower figures. In our market holders are firm in their advanced views, but buyers are reported to be offish; only buying for immediate use. The decline at the East is said to be owing to the October sales having been filled. A white-lead trust has been formed at the East which may have an influence on the lead market.

TIN—Pig in first hands is about exhausted. Tin plate on spot is dull and easy. For both pig and plate to arrive trading continues free, with sales of the latter to the extent of 50,000 boxes, ranging from \$4.95 to \$5.15. The latest reported sale to arrive was 1000 boxes of coke, at \$5.15 to an Alaska cannery.

BORAX—The market continues strong, with shipments reported to be going forward to the East.

ANTIMONY—The market continues to rule very strong in sympathy with the higher markets reported at the East. The demand is only fair, as the advanced prices restrict, somewhat, the inquiry.

COPPER—The market is reported to be quiet at unchanged quotations.

COAL—The market continues very strong, owing to importers not wishing to submit to any concessions. From a very general inquiry we are convinced that consumers are better stocked than at any time for several years past. This they did as a precaution against either a probable corner or a scarcity, owing to lessened importations from Australia. With this the case, the demand this winter will at no time be of an urgent character, while the buying will be less than last winter. A large consumer was offered and refused a cargo of Australian for prompt shipment at a slight concession.

Eastern Metal Markets.

By Telegraph

NEW YORK, Oct. 10, 1888.—The following are the closing prices the past week:

	Silver.	Copper.	Lead.	Tin.
Thursday	94 1/2	\$17 45	\$5 00	\$22 20
Friday	94 1/2	17 50	5 10	22 30
Saturday	94 1/2	17 50	5 00	22 30
Sunday	94 1/2	17 50	5 05	22 25
Tuesday	93 1/2	17 45	5 30	22 15
Wednesday	93 1/2	15 16 1/2	35 40	22 25

The market closed as follows: Lake Ingot copper seems to be entirely in the hands of the combine and the rein has been pulled rather tighter upon consumers. The quotations are 17 1/2 c for the best and 16 c for casting brands.

Pig lead, weak, lower and easy. Quicksilver is quotable at \$50.00 and 3/4. Borax is active at an advance. California refined

is quoted at 8 1/2 @ 8 3/4 c; concentrated, 7 1/2 @ 8 c, being the inside figure for car lots. Tin is dull, though a shade higher. Tin plates are steady and more active.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

TIN—Total sales are only 30 tons, although the metal evidently is a subject of interest to most of the traders, judging from the general attention given the calls. Fluctuations in price have followed less closely those of the market from abroad; London ruling on the whole lower, while we have made a net advance of a quarter cent on futures. Spot showed a corresponding gain, but has been relatively more irregular and lost 20 points from the highest.

COPPER—Is still utterly stagnant, but one sale being reported during the week, and the only fluctuations being due to neglect of those supporting the market to raise their bids to the usual level.

LEAD—Trading has fallen off to total of a trifle over 450 tons, though this metal still commands more attention than anything on the list. Prices advanced 5 to 10 points on spot and 15 to 20 on futures, but fell off again from 2 1/2 to 10 points toward the end; recovering again to-day and closing strong and fairly active at a net advance of 10 to 20 points for the week.

SPELTZ—Opened five points higher and fully maintained the advance in spite of the usual apathy in regard to this article; gaining yesterday a fraction more and closing to-day quiet and steady.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery, Australian Tin, @—; Biliton Tin, @—; Banca Tin, @—; Baltimore Copper, \$16.05 @—; Orford Copper, \$16.00 @ 16.25; P. S. C. Copper, @—; Foreign Lead, \$5.00 @ 5.25; Foreign Speltz, \$5.40 @ 5.50; Antimony, \$9.75 @ 13.50.

The Philadelphia market is reported as follows by the New York Metal Exchange Report:

PIG IRON—The market is firm, but not specially active, although a good many orders would be placed at about the old figures, but buyers do not like paying the advances which are now generally demanded. Meanwhile the entire output goes direct into consumers' hands so that for the present furnaces have little iron to offer.

MANUFACTURED IRON—A great deal of business has been recently taken, and the bar-mills are particularly crowded with orders. Plates and shapes have not sympathized to any great extent as yet, but the entire market is regarded as being in a most healthy condition, and prices are firm all the way through.

OLD RAILS—Buyers at about \$24, but there are none for sale to meet consumers' requirements.

SCRAP IRON—Sales of cargo lots No. 1 at \$24 ex ship. Other descriptions firm and in good demand.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Oct. 11, 1888.

ANTIMONY—French Star	13 1/2 @ 14
BORAX—Refined	71 @ 72
Powdered	71 @ 72
Concentrated	61 @ 62
COPPER	
Bolt	26 @ 27
Sheathing	26 @ 27
Ingot	16 @ 19 10
Fire Box Sheet	16 @ 26
IRON—Glenbrook ton	— @ 28 50
Eglinton, ton	— @ 27 00
American Soft, No. 1, ton	— @ 21 00
Oregon Pig ton	21 @ 22 00
Clay Lane White	— @ 24 50
Shotts, No. 1	— @ 23 00
Bar Iron (base price) 1/2 lb	22 @ 3
Chrome iron ore, 1/2 ton	8 00 @ 10 00
LEAD—Pig	51 @ 52
Bar	42 @ 43
Sheet	8 @ 9
Pipe	7 @ 8
Shot, discount 10% on 500 bags	Drop, 1/2 bag
Buck, 1/2 bag	1 35 @ 1 50
Chilled, do	2 05 @ 2 10
STEEL—English, lb	16 @ 20
Canton tool	9 @ 10
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
TOOL—Coke	5 00 @ 5 15
Charcoal, 14x20	6 75 @ 7 25
do roofing, 14x20	5 50 @ 5 62 1/2
Pig tin, 1/2 lb	23 @ 24
QUICKSILVER—By the flask	42 50 @ 43
Flasks, new	1 05 @ 1 10
Flasks, old	85 @ 90

PRICES "TO ARRIVE."

Per Ton.	Per Ton.
Australian, \$11 50 @ 12 00 Cardiff	11 @ 11 50
Liverpool Stm 12 00 @ 12 50 Lehigh Lump	15 00 @ 15 50
West Hartley, 12 50 @ 13 00 Cumberland bkid	15 00 @ 13 00
Scotch Splint, 12 00 @ 12 50 Egg, hard	13 50 @ 14 00

Mining Share Market.

It remains to be seen whether stocks can be kept up when the Carson river mills run all their stamps and when all the mines are able to resume operations on the lower levels. The Virginia Enterprise thinks the time is near at hand when there will be supporting props to place under stocks when they are lifted. The shafts, drifts, and all the openings, and all the apparatus of the leading mines will be in better shape when they resume work than before for many years. Not only has all been put in good shape underground, but the surface works and machinery have been thoroughly overhauled. Much new ground has been explored and opened up ready for mining during the past three months, and there will be no lack of ore when the mills can be started up.

With plenty of water there will be more stamps than can be put in operation than before in some years. If water is abundant in the Sierras the Virginia & Gold Hill Water Co. can send through their three big pipes enough to supply the Pelton wheels at both the Nevada and California mills. This would give 140 stamps in Virginia City. Certainly a more economical use of water can be made in no place in the world than when every mine connected with the Sinto tunnel is in possession of from 2000 to

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELIN'NT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
American Eagle M Co.	California.	1.	10.	Sept. 20.	Oct. 25.	Nov. 15.	J. M. Reynolds.	503 California St
Alt & M Co.	Nevada.	38.	50.	Sept. 28.	Nov. 5.	Nov. 28.	W. B. Osborn.	409 Montgomery St
Andes S M Co.	Nevada.	34.	25.	Oct. 5.	Nov. 12.	Dec. 3.	B. Harris.	309 Montgomery St
Baltimore S M Co.	Nevada.	3.	25.	Sept. 22.	Oct. 25.	Nov. 13.	A. R. Grim.	402 Montgomery St
Belcher M Co.	Nevada.	39.	50.	Sept. 18.	Oct. 23.	Nov. 12.	J. Crockett.	327 Pine St
Bodie M Co.	California.	47.	50.	Sept. 24.	Oct. 29.	Nov. 12.	C. W. Sessions.	419 California St
Crispin M & M Co.	Arizona.	1.	10.	Sept. 1.	Oct. 15.	Nov. 5.	G. B. Krutner.	628 Montgomery St
Crown Point G & S M Co.	Nevada.	50.	50.	Oct. 2.	Nov. 5.	Nov. 26.	J. Newlands.	329 Pine St
Cholla M Co.	Nevada.	26.	50.	Oct. 8.	Nov. 13.	Dec. 5.	C. E. Elliot.	309 Montgomery St
Empire G M Co.	California.	1.	25.	Sept. 19.	Oct. 22.	Nov. 8.	A. E. Low.	77 Nevada Block
Eschschuer M Co.	Nevada.	25.	21.	Sept. 6.	Oct. 19.	Oct. 31.	C. E. Elliot.	309 Montgomery St
Gould & Curry S M Co.	Nevada.	60.	30.	Oct. 2.	Nov. 9.	Nov. 30.	A. K. Durbrow.	309 Montgomery St
Gray Eagle M Co.	California.	9.	15.	Sept. 4.	Oct. 10.	Oct. 30.	O. H. Bogart.	327 Pine St
Gr Western Q M Co.	California.	2.	25.	Sept. 25.	Oct. 31.	Nov. 19.	R. E. Kelly.	328 Montgomery St
Justice M Co.	Nevada.	47.	3.	Aug. 21.	Sept. 24.	Oct. 15.	A. H. Fish.	309 Montgomery St
Locomotive M Co.	Arizona.	3.	15.	Aug. 21.	Sept. 24.	Oct. 15.	A. H. Fish.	309 Montgomery St
Lady Washington Con M Co.	Nevada.	7.	25.	Aug. 21.	Sept. 26.	Oct. 16.	L. Osborn.	309 Montgomery St
Live Oak D H M Co.	California.	10.	10.	Aug. 20.	Sept. 27.	Oct. 19.	J. Morio.	328 Montgomery St
Lord of Lorn G & S M Co.	Nevada.	5.	10.	Sept. 6.	Oct. 12.	Nov. 27.	R. N. Van Brunt.	15 Fremont St
Mono G M Co.	California.	28.	50.	Sept. 10.	Oct. 1.	Nov. 2.	C. W. Sessions.	309 Montgomery St
Montrose M Co.	Colorado.	1.	14.	Oct. 3.	Nov. 12.	Dec. 15.	F. E. Luby.	330 Pine St
Potosi M Co.	Nevada.	31.	50.	Oct. 1.	Nov. 6.	Nov. 27.	C. E. Elliot.	309 Montgomery St
Superior M Co.	New Mexico.	3.	15.	Aug. 15.	Sept. 15.	Oct. 15.	I. C. Shump.	309 Montgomery St
Savage M Co.	Nevada.	71.	50.	Oct. 1.	Nov. 7.	Nov. 27.	E. B. Holmes.	309 Montgomery St
Tuscarora Con M Co.	Nevada.	1.	05.	Oct. 1.	Nov. 14.	Dec. 5.	J. J. Scott.	309 Montgomery St
Tuscarora G M & M Co.	California.	1.	02.	Sept. 8.	Oct. 8.	Nov. 3.	W. J. Garrett.	308 Pine St
Utah Con M Co.	Nevada.	5.	25.	Oct. 4.	Nov. 8.	Nov. 26.	A. H. Fish.	309 Montgomery St
Virginia Creek Hyd M Co.	California.	6.	06.	Aug. 23.	Oct. 9.	Oct. 29.	J. M. Quasy.	406 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Contestation Con M Co.	Arizona.	D. C. Bates.	309 Montgomery St.	Annual.	Oct. 22
Eureka Con M Co.	Nevada.	H. P. Bush.	306 Pine St.	Annual.	Oct. 15
Eschschuer M Co.	Nevada.	C. E. Elliot.	309 Montgomery St.	Annual.	Oct. 15
Mayflower G M Co.	California.	J. Morio.	328 Montgomery St.	Annual.	Oct. 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	Sept. 11
Confidence S M Co.	Nevada.	A. S. Groth.	309 Montgomery St.	1.00	Aug. 6
Con California & Va M Co.	Nevada.	H. P. Butten.	309 Montgomery St.	1.00	July 9
Con California & Va M Co.	Nevada.	E. W. Heath.	315 Pine St.	25	Aug. 27
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	July 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50	Aug. 8
Idaho M Co.	California.	J. F. Lightner.	Grass Valley.	50	July 11
Idaho M Co.	California.	J. F. Lightner.	Grass Valley.	50	July 11
Standard Con M Co.	California.	J. W. Few.	310 Pine St.	65	June 12

2500 feet of fall, which allows of a head of water being used over and over by means of Pelton wheels placed along down the shafts at intervals of from 400 to 500 feet.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING OCT. 2, 1888.

390,331.—STOCK CATCHER—F. M. Able, Rocklin, Cal.

390,209.—BUTTON—F. B. Crooks, Los Angeles, Cal.

390,474.—SPRAY NOZZLE—Greene, Crofton & Greene, Oakland, Cal.

390,606.—PRESSER FOOT FOR SEWING MACHINE—Crapo, Leak, S. F.

390,305.—ORCHARD CULTIVATOR—John Morgan, Santa Clara, Cal.

390,249.—EXPLOSIVE SHELL—E. Paulson, Astoria, Ogn.

390,319.—BRACING FOR WHARVES—Thos. Thomson, S. F.

390,427.—LAWN SPRINKLER—J. S. Woolsey, Gilroy, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

LAWN SPRINKLER.—John S. Woolsey, Gilroy, Cal. No. 390,427. Dated Oct. 2, 1888

This sprinkler is of the general "Barker's Mill" type. There is a vertical stand-pipe having a coupling for the hose. On top is a cylindrical head having a tapering vertical hole extending axially through it and fitting a correspondingly tapering shaft at the top of the stand-pipe. Chambers are formed at each end of the cylindrical head to receive packing, and a peculiarly shaped angular or conical chamber around the center of the interior chamber corresponds with transverse holes made in the sleeve upon which it turns, so that water is admitted from these holes into the bent perforated arms which project outwardly from the rotary head, and are provided with holes or openings so as to rotate by reactionary force of the escaping water and distribute it over the ground.

BRACING FOR WHARVES.—Thomas Thomson, S. F. No. 390,319. Dated Oct. 2, 1888. This novel bracing is adapted especially for wharves where the depth of the water is such as would affect the stability of the structure, or where the water may be unusually rough. The essential feature of the device is a brace rod having a nut and washer on its upper end for securing it to the top of the wharf, and a peculiar clamp loosely jointed to its lower end and adapted to be fastened to the pile at the ground line. Protecting plates are put between the clamp and pile to avoid injury to the latter. In applying the brace rod it is connected to the pile before driving it, and the rod being hinged to the clamp may be turned to the most convenient position during driving. Then when the wharf is complete the rod is turned to the required inclination and added to or cut off to bring its upper end to the proper fastening point.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 20.	WEEK ENDING Sept. 27.	WEEK ENDING Oct. 6.	WEEK ENDING Oct. 11.				
Alpha.	1.60	2.20	2.05	2.50	2.35	2.89	2.60	2.95
Alta.	1.55	1.65	1.60	2.00	1.30	1.70	1.45	1.60
Andes.	.95	1.00	.85	1.00	1.00	1.05	.90	1.05
Argenta.	.50	.50	.50	.50	.50	.50	.50	.50
Belcher.	5.25	5.60	4.00	4.50	4.25	5.1	4.70	5.1
Brophy.								
Best & Belcher.	3.30	3.75	3.30	3.65	3.35	4.00	3.50	4.85
Bodie.	1.25	1.10	1.25	1.30	1.25	1.50	1.30	1.50
Bullion.	.60	.65	.55	.55	.55	.35	.25	.50
Baltimore.	.40	.45	.40	.45	.40	.50	.40	.50
Belle Isle.	1.40	1.50	1.10	1.30	1.15	1.30	1.20	1.25
Benton.	1.25	1.35	1.15	1.3				
Bodie Tunnel.								
Bulwer.	.65	.30	.55	.55	.60			
Con. Va. & Cal.	.85	.90	.90	.85	.85	1.01	.90	.95
Challenge.	4.20	4.50	3.85	4.25	4.00	5.1	5.00	5.1
Champion.								
Chollar.	2.70	2.80	2.55	2.75	2.60	2.90	2.55	3.00
Confidence.		1.11	1.11	1.12	1.20	1.61	1.77	
Con. Imperial.	.40	.45	.40	.45	.45	.75	.60	.75
Caledonia.	.35	.40		.35	.35	.40	.30	.40
Con. Pacific.								
Crown Point.	4.30	4.77	3.75	4.15	4.15	5.00	4.30	4.90
Crocker.	.80	.93	.75	.85	.85	.85	.75	.90
Central.						.30		.60
Dudley.								
Edna.								
Eureka Con.	5.50	5.75		3.50		3.35		3.50
Eschquer.	.60	1.10	.95	1.10	1.05	1.25	1.10	1.60
Grand Prize.	.80	1.10	.55	.60	.50	.55	.40	.45
Gould & Curry.	2.55	2.80	2.50	2.75	2.60	3.00	2.40	3.10
Greenwood.	1.20	1.40	1.25	1.40	1.45	1.60	1.50	1.55
Holmes.								
Independence.				1.15		.40		
Iowa.		.35	.30	.35			.35	.35
Julia.		1.00		1.00		1.00		1.00
Kent.		1.00		1.00		1.00		1.00
Kentucky.	2.93	3.00		2.50	3.00	3.20	2.75	3.15
Lady Wash.	.45	.20	.15	.50	.45	.50	.45	.50
Martin White.								
Mono.	9.00	1.15	.65	7.50	.80	.80	.90	.90
North.	3.35	3.55	.25	3.53	.30	4.00	.45	4.05
Mt. Diablo.				2.44				2.00
Northern Belle.								
Navajo.		1.50	1.60	1.75	2.23	2.05	2.15	2.15
North Belle Isle.	2.65	2.85	.65	2.79	.65	2.75	.60	2.75
Niagara.								
North.	4.10	4.15	.30	4.00	.35	4.20	.35	4.10
North G. & C.								
Occidental.	1.35	1.45	1.30	1.40	1.35	1.55	1.35	1.40
Ohio.	5.50	6.11	5.25	7.1	5.50	7.1	5.00	6.11
Old.	1.50	1.50		1.50		1.50		1.50
Phot.	2.55	2.70	.30	2.60	.30	2.64	.25	2.65
Peerless.	1.61	1.81	.60	1.65	.65	1.70	1.55	1.60
Peer.	.50	.55	.50	.50	.50	.45	.55	.55
P. Sheridan.								
Silver Star.								
Silver.	2.85	3.05	2.70	2.90	2.70	2.90	2.45	2.95
S. B. & M.	3.15	3.35	.85	3.1	.95	3.45	.05	3.50
Stages Nevada.	3.65	3.30	3.60	3.13	1.5	3.50	3.00	3.45
Silver Hill.	1.11	.55	.50	.60	.50	.6		.55
Silver King.								
Silver.	.55	.60	.50	.55		.65	.55	.60
Syndicate.								
Union Con.	3.20	3.50	3.10	3.25	3.05	3.60	3.20	3.45
Utah.	1.15	1.30	1.10	1.23	1.15	1.23	1.20	1.30
Yellow Jacket.	3.94	4.35	.75	4.23	.45	5.00	.60	5.00

DELINQUENT SALE NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer county, California. NOTICE.—There are delinquent upon the following described stock, on account of Assessment (No. —) levied on the 4th day of September, 1888, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	Shares.	Amount.
D. Bowers.....	73	500	\$25 00
Wm. McCoy.....	329	40	2 00
Theo. Wetzel, Trustee.....	364	8	40

And in accordance with law, and an order of the Board of Directors, made on the fourth day of September, 1888, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, room 9, No. 327 Pine street, San Francisco, Cal., on Tuesday, the thirtieth (30th) day of October, 1888, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

O. H. BOGART, Secretary.
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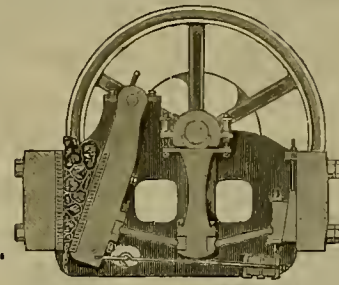
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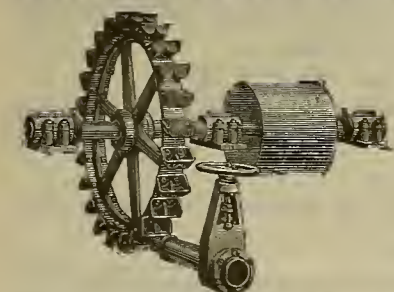
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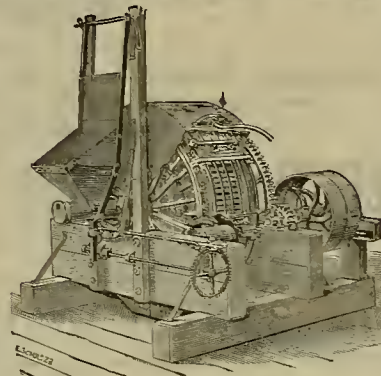
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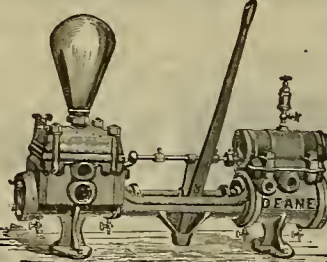
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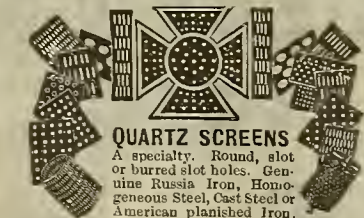
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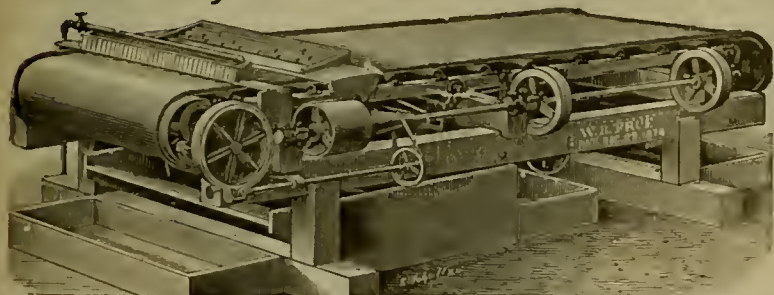
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THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

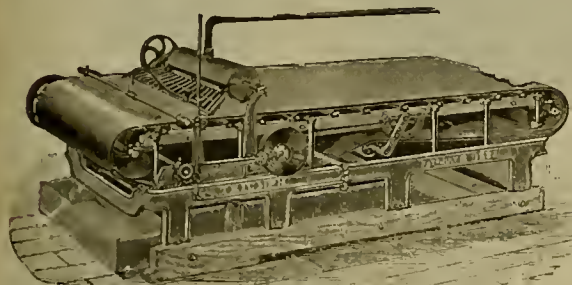
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The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

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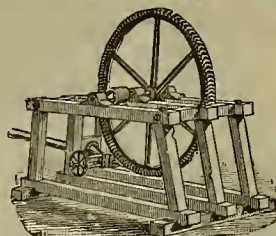
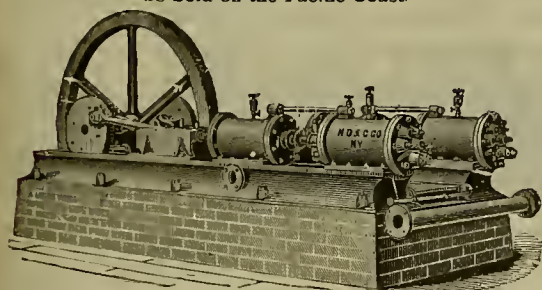
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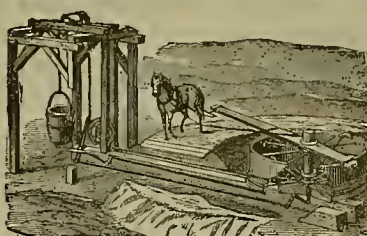
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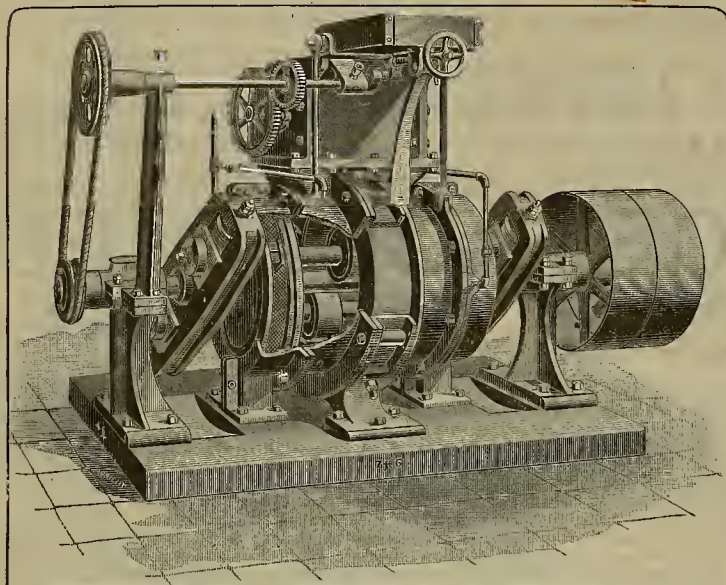
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FRISBEE WET MILL. DOUBLE "ECONOMIC" STAMP MILL.

This Mill, with a weight of less than 9000 pounds has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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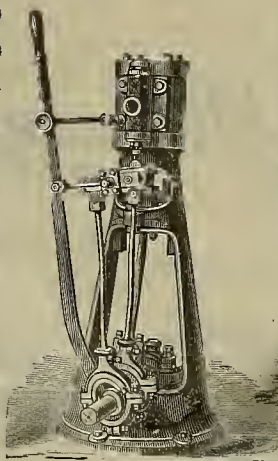
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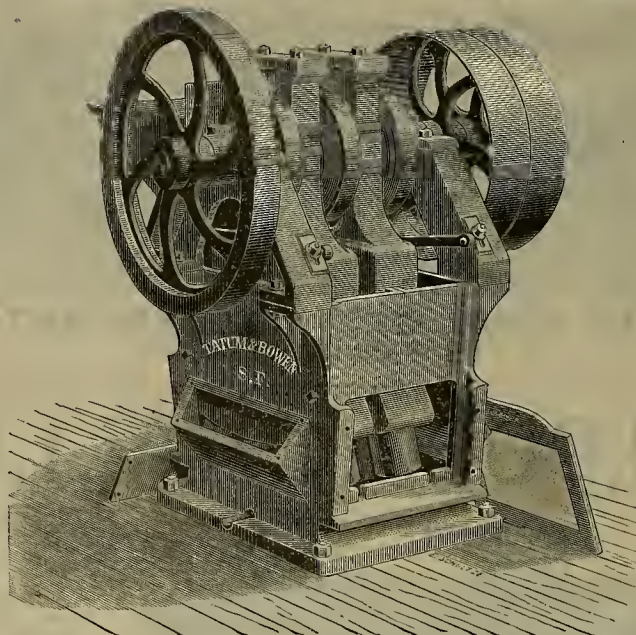
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DOUBLE "ECONOMIC" STAMP MILL.



We have here the Stamp Mill in a cheap and simple form. The high drop of the old stamp is more than compensated for by the great weight (1200 lbs. each) of our stamps, and the rapidity (300 strokes each per minute) with which they run. There are 4 shoes in each stamp, so that there are 4800 strokes of the shoes on the dies per minute. Less power is required than in any other mill to do the same amount of work.

The Mortar has screens at both ends, giving ample discharge. There are no cams or tappets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

AN AUTOMATIC ORE FEEDER

Goes with each Mill. We also have a suitable

Rock Breaker.

Several Mills are now in the mines doing excellent work. The "Economic" is not only a mill for small mines, but we believe it is destined to SUPERSEDE THE OLD STAMP IN MILLS OF THE LARGEST CAPACITY.

TATUM & BOWEN,

34 and 36 FREMONT STREET, SAN FRANCISCO, CAL.
Manufacturers of Mining and Sawmill Machinery, Engines, Boilers, Etc.

THE RAND DRILL COMPANY, 23 Park Place, New York.

We are now so situated with our new works as to offer to the miners of the Pacific Coast SMALL AIR-COMPRESSING PLANTS at such prices that almost any small mine can afford to put in power drills if they have none in use.

By our NEW AND PATENTED SYSTEMS (by which the duty or performance of drills is not reduced with use) it is no longer necessary PLANTS IN THIS COUNTRY, and has patterns for all sizes up to 10-inch diameter of cylinder.

In respect to capacity IN SPEED OF DRILLING, perhaps it is in order to say that in EVERY AUTHORITY CONTEST for speed yet initiated, the RAND DRILLS have, without exception, BEEN VICTORIOUS. This fact, coupled with another important one, that the drills use much LESS AIR and cause LESS REPAIRS, has won for them nearly all of the Eastern mining trade, which has kept their works always busy.

Since the reasons which formerly restrained us from the California market no longer exist, we are now in the field for the business.

SPECIAL ATTENTION is called to the latest designed sectional Compressor just built for the Batopilas mine in Mexico, and to the Compound Engine Compressor built for the Anaconda mine in Montana.

ROCK DRILLS
AIR COMPRESSORS & GENERAL MACHINERY FOR MINING, TUNNELING, QUARRY & RAILROAD WORK.
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to buy a Compressor of double capacity than the drills are expected to require, in order to keep up the supply of air necessary on account of the wear of drills and compressor.

Besides having THE NEWEST AND LIGHTEST designed small drill plants, the Rand Drill Company, as is well known, has built, and is now building, the LARGEST COMPRESSOR

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To Buy or Lease Graphite Mine or Location. Address: PASADENA MINING & DEVELOPING CO., PASADENA, CAL.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 20, 1888.

VOLUME LVI
Number 18.

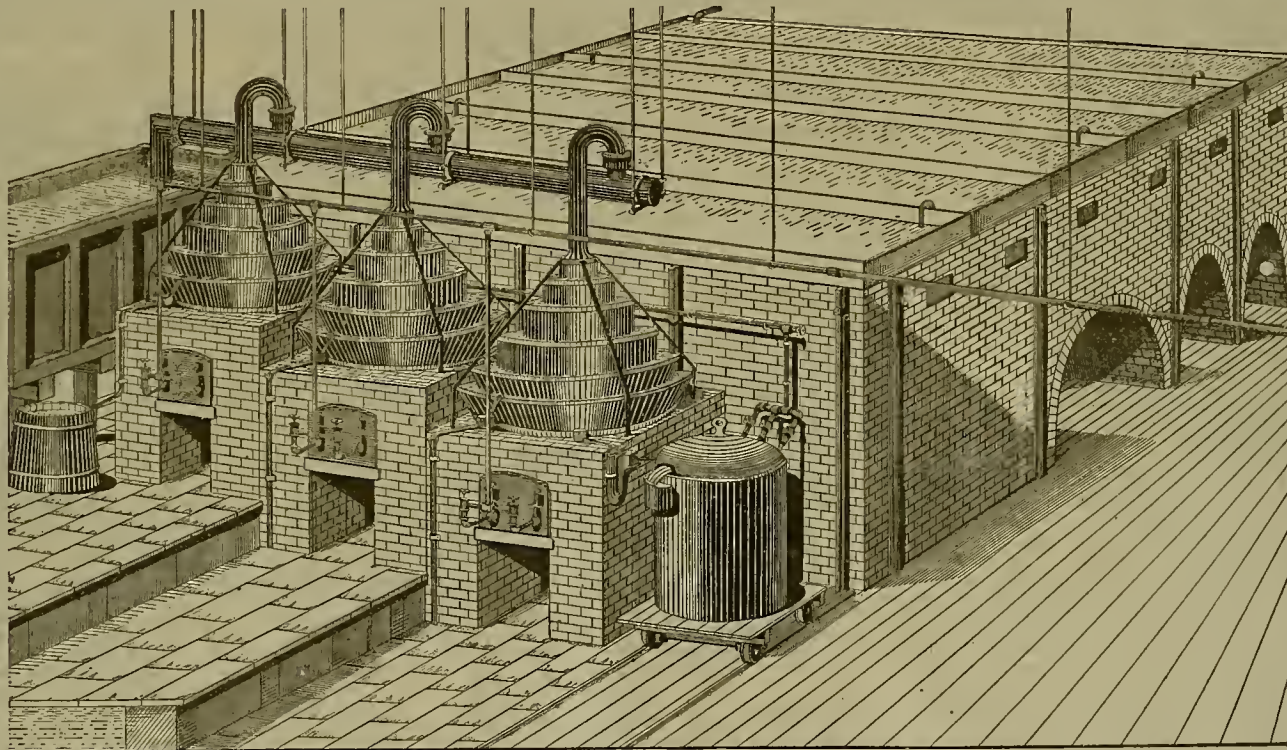
Alien Mine-Owners.

The subject of alien ownership of mines is to be investigated and reported on to Congress. It will be remembered that when the Alien Land law was passed it was so worded that it prevented foreign individuals or companies from acquiring, in any way, mining property in the Territories of the United States. The mine-owners and prospectors in the Territories strongly objected to this, as they were debarred from selling to a class of people who had always been liberal buyers, and who really advanced the mining interests to a large degree. Petitions were sent to Congress, and finally a bill passed the Senate amending the Act so as to omit the mines, thus permitting aliens to purchase mines in the Territories. The bill went to the House, where it is still pending. To remove the apparent misapprehension of the object of the bill, a resolution was introduced in the Senate instructing the Committee on Mines and Mining to ascertain the number of aliens and foreign corporations owning mines in the Territories, the length of time they have been so engaged, the amount of capital invested, dividends paid, and the effect that such ownership has upon the growth and prosperity of the Territories.

It was decided to appoint Senators Mitchell of Oregon and Stewart of Nevada a special committee to investigate the question. It seems rather strange that California, the oldest mining State, was not represented on this committee, especially as one of its Senators has a thorough knowledge of mining matters and is one of the richest and largest mine-owners in the United States. We see there is some little wrangling because two Republicans were appointed and no Democrat. But this is in no sense a political matter, and the political complexion of the investigating committee can have no effect one way or another. The fact is, the people of the Territories know better what they want and what is good for their interests than Congress does. If they want the privilege of selling their mines to the highest bidder, whether home-born or alien, they ought to have it. Under the present laws, foreigners cannot patent mining ground, and as foreign companies will not buy unless the ground is patented, some citizen is sure to make the sale. The foreign companies pay good prices, develop their properties, put up reduction works, employ many men, and always pay their bills. Where

ever they have taken hold of mining property in this country they have benefited the camp and surrounding region. This the Senate Committee will find to be the case in the course of their investigations.

THE NEVADA QUEEN.—From the annual report of the Nevada Queen mine of Tuscarora, Nev., it is seen that 913 tons of ore have been shipped to the mills, which amount has been milled, yielding a product in hullion of \$162,735.09 besides about \$20,000, estimated value which still remains in the mill, no cleanup having been made. The greater part of the ore



PLATINUM STILL PLANT FOR THE MANUFACTURE OF SULPHURIC ACID.

milled during the past year, excepting about 300 tons from the 200-foot level, was taken from the 350-foot level. There are about 6000 tons on the dumps at the mine, most of which was extracted from the 350-foot level stopes. The average assay, as taken from car samples, gave returns of \$26.39 per ton. The concentrating plant is about finished, and can be started about November 1st, or as soon as the Water Co. can furnish water. The erection of the new mill is progressing very favorably. The increased facilities, available in the coming year for treating the ores, will greatly assist in the economical reduction of the large ore reserves now in sight.

THE CRESCENT MINING CO., Utah, received from ore sales last year \$187,989. The work of the concentrator has been very satisfactory during the past year, having worked 20,000 tons of second-class ore at a fair profit to the company. The statement of work for the year ending Sept. 30, 1888, shows that the main shaft was sunk 123 feet; inclines, raises, crosscuts and drifts, 2514 feet; and there are 7550 cubic yards of stoping taken out, and for excavations for stations, 6736 cubic feet.

A MINER'S Union has been organized at Granite, Montana, with 200 members.

Sulphuric Acid.

The manufacture of sulphuric acid is now a gigantic industry. In this country alone the production has increased from 60,000 tons in 1867 to 450,000 tons in 1887. The present increase in manufacture of this acid in the United States is almost wholly from pyrites ores, which we have in almost unlimited quantities. The largest consumption for such acid is for the treatment of other native products—petroleum, rock phosphates, etc. W. H. Adams of N. Y. read before the American Institute of Mining Engineers a paper on "Twenty Years' Progress

Livermore Coal.

The existence of coal near Livermore, Alameda county, has been known for many years, and some little mining was done there a long time ago. It is not, however, until within the past year or so that active operations of any magnitude have been carried on. The coal is "soft," like all that has ever been found in this State, but answers very well for most purposes. The company is now about to erect hoisting-works on the Pen Darien incline on the Summit mine. The incline is down 100 feet in an eight-foot seam of bituminous coal.

At the Richards incline coal has improved 10 per cent in quality in the last 50 feet. This company has also purchased all of W. T. Coleman's coal lands, some 2340 acres, and work will be commenced on the Eureka and adjoining mines this year.

It is stated that as soon as the company is in a position to ship 200 tons a day regularly a railroad will be built from Livermore to the mines, the estimated length of the road being 10 miles. An organization has already been perfected known as the Livermore Valley R. R. Co., with a capital stock of \$1,000,000. The

directors are J. N. Knowles, Israel Lawton, I. W. Taher, F. Danham, D. Guttman, Geo. W. Comegys and B. Noyes.

QUICKSILVER FLASKS.—The well-known "A" brand of quicksilver is shipped direct from the New Almaden mine, Santa Clara county. The trademark "A" on top of the flasks is secured by U. S. patent, and registered. Flasks contain 76½ pounds of quicksilver. Foreign quicksilver is sold in flasks containing only 75 Spanish pounds, equal to 76.07 pounds avoirdupois or 43-100 of a pound less than is contained in flasks of "A" brand. Foreign-made flasks are undersized, badly made, and not fit for second use. The brand referred to above is put into American flasks, which, when empty, can be sold readily at ruling market rates. The advantage is largely in favor of the purchase of American quicksilver at equal price.

THE GRANITE MOUNTAIN MINING CO. of Montana paid a dividend of \$200,000 on the 10th, making \$1,400,000 this year, and \$5,200,000 in all. With the exception of the Calumet and Hecla copper mines, Lake Superior, this is the largest amount paid by any American mine this year. The last-named mine has paid so far this year \$1,500,000 in dividends.

in the Concentration of Sulphuric Acid," in which he sketches the gradual growth of the business and the changes in the apparatus.

In this paper he gives a sketch of the largest and most successful plant in the United States, shown in the cut on this page. Foreign-made stills and pans of varying dimensions are well known here, and the cut shows a plant of the most advanced type of shallow-basin platinum stills and their accessories. The plant as shown has a capacity of 500 carboys—say 80,000 pounds—daily, and the fuel and labor costs are very low. Outside of the deterioration of plant, or waste of platinum, this construction with gas firing guarantees the best results yet known for commercial acids of 66° Beaume.

GEORGE ROBERTS, inventor of the steam track-layer, has received a contract to lay 35 miles on the Northern Pacific Short Line from Cheney west toward Ellensburg, W. T., this fall. Roberts is now preparing a machine to go to the scene of operations.

KNIGHT & CO.'S foundry at Sutter Creek, Amador county, is now quite busy. They have now in course of completion four water-wheels, and are also building a 10-stamp mill to go to Placer county.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Mining in Sonora, Mexico.

EDITORS PRESS:—As you intimate a desire to get intelligence from this quarter of mining operations in progress, I inclose the following, which may interest.

The first item, perhaps, of which mention should be made is that the mine-owners and superintendents of mines of this State are to have a convention in this city, on Oct. 21st, to discuss the situation, form an association, and take such concerted action as may seem to be required for mutual advancement and for bettering the condition of the industry in the State. Incalculable benefit will result if wise and prudent counsels prevail. This seems to be assured because of the prominent persons whose names appear in the call which is headed by the acting Governor, the second name being the representative in the Federal Congress for the State. The other names are well known in this section.

There is a great field for such an association to work in, and there is no doubt in the minds of those who know that much aid can be rendered to the Government through its efforts. I inclose the call.

The Federal Government has granted seven or eight mining concessions to various parties in the State, all on the same general terms. By the contracts, which run ten years, with a forfeiture placed in the hands of the authorities to insure compliance, the parties receiving such concessions are obliged to explore or prospect their claims, which are generally about 12 by 18 miles in extent, and inside of five years to invest \$225,000 in working the same.

They are obliged to keep some 30 or more men constantly at work, to erect proper reduction works and reduce at least three-quarters of their ores in Mexico.

At the end of ten years the conceded territory, i. e., the mineral it contains, reverts back to the Government with the exception of the mines worked by the parties holding the concession. The titles of these last-named mines will be given in precisely the same way as the Mining Code now provides for, and after the ten-years' limit has expired they are held under the same regulations in every particular as other mines.

The contracts already published call for the investment of over \$2,000,000 inside five years, and this is sure to produce activity here and make money circulate. There will be very little opportunity to avoid compliances with the terms of these contracts, as they are under the supervision of the prefects and officers appointed especially to look after them.

Remarks have been made in various ill-informed quarters in the United States derogatory to the principle under which these concessions are given and their terms, but for my part I consider that the result is sure to be beneficial and give a permanent impulse to mining matters in the country.

I will give you a more general letter next week. HARRISON.

Hermosillo, Sonora, Sept. 20th.

Following is the circular referred to:

HERMOSILLO, SONORA, Sept. 17, 1888.

Dear Sir:—You are hereby cordially invited to attend the convention of mine-owners and superintendents to be held in the city of Hermosillo on Oct. 21st proximo, when a mining association will be formed and matters of great importance to all engaged in mining discussed.

Acting Governor, Ramon Corral, Prieta mine; Congressional Representative, Rafael Izabal, Noche Buena; Antonio Calderon, Las Guijas; Ricardo Johnson, Grande (Moctezuma); C. Rueda, Almagro; E. A. Price, Creston; Jno. R. Magruder, Yaso; James D. Fresh, La Gloria; E. H. Hathaway, Las Delicias (St. Helena); L. W. Tatum, San Ricardo; C. F. Bergen, Ahogada; Schulze & Pletz, Chipionena; Francisco E. Rodriguez, California; J. E. Jackson, Los Tajos; M. E. Clinton, Sta. Teresa; W. Mansfield, Mina Grande.

Selling Mines in London.

EDITORS PRESS:—In a recent issue of your paper, I read with considerable interest an article from Major McLaughlin on the present state of the London market. It seems "capitalists" over there have been victimized so often through American mining ventures, they fight shy of properties of that class. This statement is in one respect misleading. The big people to whom mines are taken in London hardly ever put their own money into such enterprises. When they accept of a mine they put it on the market and endeavor to pay for it out of the sale of shares. If the public subscribe, well and good; the mine is sold; but surely money derived in this way from the masses cannot be said to come out of the pockets of "capitalists" properly so called.

Without splitting hairs, however, on definitions, we will admit the complaint urged is not without some foundation. The majority of mines from this and other countries, that have been floated in London, have not as a rule proven profitable. Are we to infer from this there is nothing in the business? As far as this coast is concerned, some of the largest fortunes in the world are here, and mining is the corner-stone of most of them.

All over the State are magnificent producing

properties whose names are household words. How is it, then, we manage to have such good mines at home and that we send such poor ones abroad? The reason, in my opinion, is that the methods pursued by London promoters absolutely exclude the possibility of their getting good mines. They will never pay anything down toward that object, and they are so frightfully slow and unsatisfactory in other respects, no one here, at least, will do it for them. It may be set down as a truism that no good mine can be procured for sale without money. Here is a large and valuable ledge, developments extensive, ore enough in sight for years; a mill even may be in operation and dividends in order. Does any one suppose the owner of such a property is going to give it up to irresponsible people to be hawked about London—to be hummed and hawed over for six months or longer—and finally returned to him perhaps unsold—all without a consideration? Rest assured he is not going to do anything of the sort. He is generally willing, on the basis of a certainty down, to give a bond to a responsible party. This latter, however, knowing how much red tape there is in London, how slow they are to enter on a negotiation, how long they are in making up their minds, etc., calculates the whole time of his bond will expire before the first steps toward a sale are taken. He knows he will then have to pay the owner another large sum down for an extension or forfeit what he put up in the first place, and, considering the management as being altogether too one-sided, he declines to entertain the matter at all, and so a really great mine is lost to English investors.

This, I think, is the key-note of the whole difficulty. If London operators want good mines to float, they will have to pay for the privilege of getting them, or at least be more ready to take some action when such are brought to their notice. If they will not adopt either course, they should not complain, but be satisfied with the thousand and one prospects and abortives which they are incessantly foisting on the public over there as valuable gold mines. VENDER.

The Lixiviation of Silver Ores With Hyposulphite Solutions.

This above is the title of a new work from the pen of Mr. C. A. Stetefeldt. Our readers are aware of the impetus which has been given to lixiviation by the discovery of the Russell process. Our columns have from time to time given an outline of the successive improvements which have been made in this process, and its literature has already become quite voluminous. Two papers have been previously published on this process by Mr. Stetefeldt and one by Mr. Daggett in the "Transactions of the American Institute of Mining Engineers." The facts already accumulated have been so many, and in some cases so unexpected, that there has been great need for some discriminating critic to work over the whole mass of results and to present to the profession a well digested hand book on lixiviation in the light of the new method.

This work has been admirably done by the experienced hand of Mr. Stetefeldt, and the result is a neat volume which is at once the most thorough, systematic and reliable treatise on the lixiviation of silver ores that has ever been published. Of course a great deal of space is given to the special methods of the Russell process, but the whole ground of the lixiviation of silver ores by hyposulphite solutions is gone over very carefully, and the practitioner will find an abundance of information on many obscure points that are seldom discussed in print.

The arrangement of Mr. Stetefeldt's work is such that references can readily be made at once to any desired point, and at the same time provision is made for additions of new subject-matter in subsequent editions without altering the old reference numbers. The ingenious system of paragraphing by which this is effected was, we believe, first suggested by Dr. R. W. Raymond.

Part I of Mr. Stetefeldt's book is devoted to the chemistry of the lixiviation process. The chemicals used are investigated, their cost, commercial rating, tests for purity and the relative economy of different grades carefully considered. Next the reactions of sodium hypsulphite solutions and the solubility of various metallic compounds in them are taken up. Then the reactions of the "extra solutions" are considered, and the decomposing effects of heat are studied. The chemistry of wash-water, a subject usually neglected, is carefully considered. The relative advantages of sodium and calcium sulphide as precipitating agents are thoroughly discussed, and it is clearly shown that in spite of greater cost, sodium sulphide is in general to be preferred. Finally the first part is concluded with a detailed account of the nature of the laboratory work.

This Part I contains a mine of valuable information on certain chemical relations of great importance which have hitherto been little understood, and from the lack of which many expensive failures have resulted in treating difficult ores. Much of this work is due to the indefatigable labors of Mr. Russell, whose voluminous researches have been condensed into their essential results by the author, but a great part of it is the work of Mr. Stetefeldt himself, who has gone over much of Mr. Russell's work where the results seemed doubtful; and he has added much new matter necessary

to a complete and logical presentation of the whole subject.

There is, however, one slight matter which seems open to criticism; that is, the manner in which Mr. Russell arranges his laboratory tests with extra solution. He has finally adopted eight separate methods for raw ores and eight for roasted ores. Mr. Stetefeldt has, after some investigation, reduced this number to five in each case, not feeling at liberty without further investigation to make a more radical reduction in their number. It is true, as he remarks, that this laboratory work looks more formidable than it is in reality, as in general it has only to be gone through with in any given case once, when the ore is first investigated. After that, only two or three of the methods are used to check the daily work. But the objection we make to Mr. Russell's laboratory tests is that they seem to us entirely empirical, and not as they ought to be selected to imitate as far as possible, on a small scale, the essential conditions which exist on the large scale. Of course it is not possible to imitate them all, nor would it be necessary. In proof of this we cite the fact mentioned by Mr. Stetefeldt (p. 96): "In addition to this, Mr. Russell found that in many cases identical methods applied in the laboratory and in the mill did not give equal results, but that there is, in every case, some one laboratory test, the results of which closely correspond to those of the most advantageous method used in the mill." This lack of correspondence between the laboratory and mill tests is easy to understand when we consider that there is often very little correspondence between the conditions maintained in the two cases, density of hypsulphite, for instance. It would evidently be of great convenience in determining the applicability of the Russell process to new ores if the method which gave the best result on the small scale had some definite relation to the results obtained on the larger scale. We hope that this matter may receive some further attention at the hands of Mr. Stetefeldt and Mr. Russell. But, after all, this is a small matter, and inevitable in opening up a new method where there are so many more important subjects to receive attention.

Part II takes up the lixiviation process in its practical application, and describes in detail the lixiviation plant. Many of these details are new, and others are the results of considerable experience; they are all well worked out. The solutions, the handling of the ores in the vats, of the wash-water, the lixiviation proper, the precipitation of the silver and of the base metals, as well as their subsequent treatment, all receive close and critical attention, and many original suggestions are made well worthy of a careful trial. Data for mill construction, estimates of cost of plant and of running expenses, are given as far as experience warrants, and make a good showing for the Russell process.

The work concludes with a comparison of the Russell process with ordinary lixiviation, and with amalgamation both of raw and roasted ores. These results are already in part familiar to the readers of the PRESS, though Mr. Stetefeldt presents some of the latest results from the experience at the Ontario mill, which are entirely new.

The reactions of cuprous hypsulphite, which play the most important part in the Russell process in effecting a high extraction of silver, recall the well-known part played by cuprous chloride in nearly all processes of raw amalgamation. When in addition to this we remember the remarkable solubility of silver salts in hypsulphite solutions we can readily understand how some of the remarkable results obtained with raw ores by the Russell process should have come about. The simple and inexpensive plant required for this process, the small amount of power and of manual labor required, render the lixiviation process in its improved form a very formidable rival to amalgamation. The good results which have sometimes been obtained with tailings from amalgamation suggest also many good openings for the process. The Comstock tailings, for instance, on which so many processes have been tried in vain, would make a good opportunity for the Russell process. We understand that experiments in this direction are already projected. Also that several new mills of large size for the Russell process are shortly to be finished, so that experience with the process is likely to accumulate.

There is one thing, however, about this method, in common with other lixiviation methods, which should be better understood. That is, while it requires but little skilled labor to carry on the operations, it does require a skilled metallurgist at the head of the work to give it his constant personal attention. The investigations of Mr. Stetefeldt show how delicate are many of the chemical and physical conditions on which the success of the process turns, and it is easy to see why so many lixiviation processes fail when they are put in the hands of what Mr. Stetefeldt delights to call "the insular amalgamator," the man whose muscular development exceeds his mental training and skill. Such a man has his place in reducing ore, but it is not at the head of a lixiviating-mill, least of all with a new method where there is still much to learn.

Mr. Stetefeldt's work will do much to convince those who study it thoroughly that it will pay corporations to put their milling-work in the hands of competent men whose theoretical training has been sufficiently thorough to make their practical experience of some use to them. When this is done, the "muscular amalgamator" will be assigned to his true place, where he will be of use at handwork in-

stead of headwork, and much money will be saved thereby.

In conclusion, to those who wish the latest information on the subject of the lixiviation of silver ore in a compact and well-digested shape, shorn of needless verbiage and obsolete and abandoned methods, we can recommend this work as the standard authority.

Electric and Cable Transmission of Power on the Comstock Lode.

The following interesting description of the cable system of transmission of power, now in use on the Comstock, as well as the electric system about being introduced, from the well-known Virginia City correspondent, Dan De Quille, will be read with much interest:

The Comstock mines are now in a very prosperous condition.

It is true that we have no such great and almost fabulously rich bonanzas as was that found in the California and Consolidated Virginia mines some years ago, but more different mines are now yielding paying ore than ever before at one time. Also, constantly, improvements in mining and milling machinery are being made. We can now profitably work ores that we could not touch a few years ago. Wood and mining timbers are cheaper now than ever before, and transportation by railroad to the mills on the Carson river has been lowered.

Also we have now laid from this city to the Sierra Nevada mountains no fewer than three lines of large iron water pipe. These pipe lines afford water for driving mills at the mine by water-power. The Sutro tunnel now affords us opportunity for this economical use of all the water that can be brought to this city. It gives us 1600 feet of fall everywhere in the city—yes, over 2000 feet of fall, as from the point here where the water is carried along the side of Mount Davidson down to the taps of the shafts of the leading mining companies there is from 500 to over 600 feet of fall. At every mining shaft in town we have at least 2000 feet of fall for water-power.

Cable Transmission.

The Pelton water wheel makes it possible for us to utilize every foot of this fall, and to use the same water over and over. The following examples will explain how this feat is accomplished: At the battery-mill of the Consolidated California and Virginia Mining Co. water is brought down off the side of Mount Davidson through a heavy iron pipe. It reaches the mill under a vertical pressure of 616 feet. The pipe carries 160 miners' inches of water, and this is turned upon a Pelton wheel 10 feet and 10 inches in diameter. This one small wheel drives 80 stamps and 12 pulp-grinding pans, running some 200-horse power. The pulp from the batteries is not amalgamated in this mill. It flows (from the grinding pans) through a four-inch iron pipe to the California amalgamating-mill 1500 feet further down the side of the mountain.

The California battery-mill stands about 100 feet below (saw of) the main shaft of the mine, known as the C. & C. shaft—California and Consolidated Virginia. After the water has exerted its force upon the surface wheel in the battery-mill it is caught up and carried through a short drift to the C. & C. shaft, which connects with the Sutro tunnel at a depth of a little over 1500 feet. The water is carried down the shaft in a large iron pipe. At a depth of 500 feet it is turned upon another Pelton wheel of the same size as that in the battery-mill. Having spent its force on this wheel, the water is caught up (it falls from the wheel dead and gentle) and turned upon a Pelton at the 1000-foot level and upon a third at the 1500-foot level. By means of steel wire cables the power developed by all these wheels down in the shaft is brought to the surface. At the surface the cables land the combined power of the three wheels on a huge horizontal steel shaft 150 feet long. At the farther end of this shaft (outside of the hoisting works) are large grooved pulleys, over which run round steel wire cables which transmit the whole power of the three subterranean Peltons to the big pan-mill, 1600 feet to the east down the side of the mountain. There are driven all the pans and settlers of the amalgamating-mill, five dynamos (which furnish electricity for use in amalgamating by the Rae process) and much other machinery, with still power to spare.

The cables, by means of which the power is transmitted, pass over supporting pulleys that are placed on the tops of five wooden towers. On one of these towers (called the Angel tower) the direction of the cables is changed from east to almost due north. In all, from the bottom of the shaft to the mill, the power is transmitted 3100 feet.

Electric Transmission.

This is an example of the transmission of the power of Pelton wheels by cable. At the new Nevada water-mill close below the main shaft of the Chollar mine, we are soon to see the power developed by Pelton wheels, transmitted by electricity to the surface and then a distance of about 100 yards to the mill named. This mill contains 60 stamps, with a full complement of pans, settlers and other apparatus. A Pelton wheel ten feet and ten inches in diameter drives 40 of the stamps, with their pane and settler, under pressure of a vertical column of water 460 feet in height—being the fall attained down the side of the mountain. Here, too, the water is caught up as it drops lifeless

AN American economist says that every \$5 of precious metals dug out of the earth since 1850 has cost \$6.

Something About Elevators.

NUMBER III.

Of course it is a question of public importance that the risk attaching to the various kinds of mechanical-lifting power should be reduced to a minimum.

Whether for freight or for passengers, that one should be adopted which is safest. Almost every month some new safety clutch is patented and placed on various wire-rope elevators to the assured safety of the passengers—assured, that is to say, until it is actually required, and then it is found from some cause or other (most pronounced when least convinced) that the safety clutch is an imposture, and no wonder. No apparatus can be relied upon to supply a sudden want unless it is constantly in use, and as these clutches are never tried from the time they are put in, it is a matter of course that when wanted in an emergency they are too stiff to work efficiently.

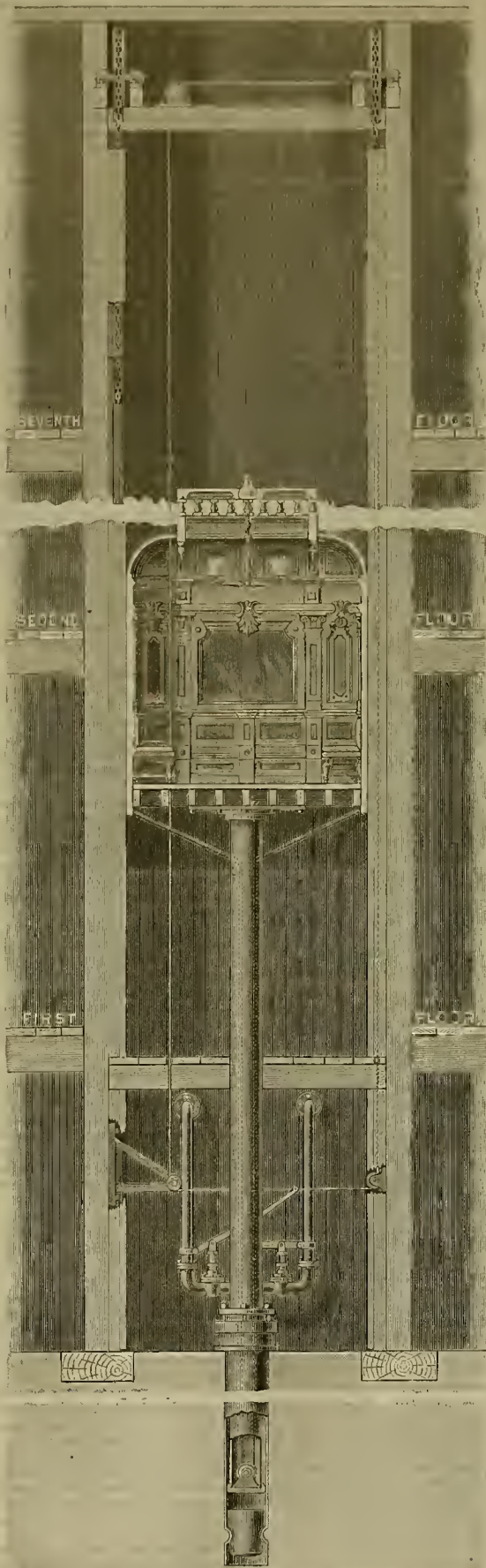
There is very little difference, after all, in the multiform wire-rope elevators, whatever the motive-power may be. There is always the question of gearing, and this being given, any force may be used to drive them. The steam engine is at all times a dangerous article for elevators, there are so many superadded risks in connection therewith. The engine itself is liable to give way, a cylinder cover may blow out, the piston rod may break at the crosshead, the gearing itself may give way, and there is also the fact that there is considerable danger of overwinding, while the expense of lowering is as great as that of raising.

The gas engine as a motive-power has all the risks of the steam engine and more besides; gearing being inevitable, owing to the peculiar intermittent nature of the engine, straps have to be used, and these are of all transmitters the most dangerous. Thus, in an elevator worked by a gas engine, in addition to the ordinary risks, there is the risk attending the use of driving straps and gearing in the working crab, and of brake gear, the possibility of overwinding and the extra strain on the whole mechanism due to the shock of the explosions. We naturally look to hydraulic-power for a solution to these difficulties, and it will be at once seen that one element of danger ceases, and that is, no brake-power is required, as the escape of water through the valves is regulated simply and easily to allow of the gradual descent of the elevator, and in addition to this the stuffing-box acts as an automatic brake by the friction caused by the passage of the ram. Then the perfection of control by a hydraulic ram is obtained, as one single valve suffices for all the motions required.

"Which force," asks Mr. Ellington, a London expert, "will give the greater efficiency—power acting by fluid pressure on a ram passing through a single stuffing-box or leather, or the same power acting through ordinary gearing and finally winding the lifting chain upon a drum? The loss of useful effect from the latter cause alone may equal that due to the friction of the ram. When the water pressure is available without pumping, the question of relative economy, as between hydraulic and ordinary gearing, does not require argument; that by hydraulic gear is the most economical is sufficiently obvious."

As regards efficiency, it is well known that a direct-acting ram of careful manufacture gives an efficiency of between 70 and 80 per cent. No geared elevating machinery driven direct by a steam engine gives anything approaching so high an efficiency as this, and even what efficiency it would give would be greatly reduced if the steam engine had to be kept constantly moving, which would be a greater loss than that arising from the invariability of hydraulic-power, while it may be remembered that though the power of hydraulic elevators is invariable, yet when lifting light loads there is a considerable gain in speed. "Until, therefore, it can be shown," says Mr. Ellington, "that the use of hydraulic pressure with a *direct-acting ram* entails more friction than a system of ordinary gearing to do the same work, hydraulic-power will remain the most economical as well as the safest agent for direct lifts." A cage raised and lowered on the top of a ram (the cylinder being sunk in the ground) is the simplest form of hoist. Provision in this case has only to be made for a varying weight due to the altered condition of the load. As the ram rises the head and pressure diminishes, while

the weight of the ram increases as it is less and less immersed in water. A counterbalancing weight is therefore required to lower the cage when empty and to adjust the varying weights of the chain as the cage rises and falls, and also to balance the weight of the ram. The counterweight is usually attached to the chains connected with the cage and passing over fixed pulleys, sometimes differently fixed to meet peculiar requirements; in some cases the rams are concealed from view by being inclosed in the main columns, and in other cases, when very heavy loads are expected to be used, auxiliary pistons are provided. It will thus be seen that these elevators can be readily modified to meet all possible requirements.



MILLIKEN'S IMPROVED DIRECT-ACTING HYDRAULIC RAM ELEVATOR.

abears at the top of the elevator frame. The amount of weight to be provided must be sufficient to balance the cage and the whole weight of the ram when at the top of the stroke, *minus* the weight of the chain, which then assists the counterweight. The accompanying sketch shows Milliken's Improved Direct Acting Hydraulic Ram Elevator, and indicates the method of construction and the manner in which they are usually arranged in buildings. They are,

The drawing is not made to scale, as it would then occupy too much space in our columns, but all the required parts are shown in vertical section. The main ram is a simple tube of wrought iron, which sustains the cage at the top and passes down into the well as the cage descends, the well guide-posts being made of either wood or iron, as required.

The simplicity of the machinery must commend itself to all engineers, the working parts

consisting only of a ram, the well tube and a pair of valves. There are no parts that will wear out, and with the exception of the packing gland or stuffing-box, which could be repacked by the boy who has charge of the elevator, if necessary, there is an entire absence of friction—at most, the friction might be put down at say a fifth, while the guaranteed efficiency of a direct ram, if properly erected, should be eight-tenths.

Water enters the cylinder and is discharged through the two vertical pipes shown in the lower story in our engraving, and the motion is controlled by a simple and ingenious valve arrangement. These valves, we understand, required formerly an elaborate kind of gearing which is now replaced by three *simple* levers operated by the rope as shown. This rope passes through the cage, over the pulleys at the top and returns at the side of the well. The cage is balanced by counterweights sliding within the main guide-post or in separate ways for the purpose.

These weights are suspended on chains passing over the large pulleys at the top, but are not attached to the cage in the usual manner, for they are connected to wire ropes passing round the cage into the main ram and from there to the bottom, where they are attached to the bottom cap as shown in our illustration.

This cap is made large enough to come into contact with the packing-box at the top of the cylinder, so that the cage can never overrun to the top as some elevators have done.

It is claimed by the agents here, Messrs. W. T. Garratt & Co., that Milliken's Ram Elevator is the safest, most economical and most efficient in the universe, and after a careful study of the machinery, and seeing the working parts doing their duty at the various large stores and buildings in San Francisco, we are not prepared to dispute the fact. On the score of safety it will be readily seen that the direct-ram system absolutely precludes the possibility of falling. No catch or safety-springs are required when the piston rod or ram acts as a prop underneath the cage. Even supposing the cage could fall, it would descend only as quickly as the ram could displace the water below, which might be compared to a door being closed by a patent "Norton" door check. The door simply *cannot* bang to, and in the same way and practically for the same reason, the ram cannot bang back to its place; it *must* descend gradually.

As regards economy, the quantity of water required to raise a certain load is always the same; to this must be added friction of working parts and resistance of gearing, etc. Now the economy of this ram elevator consists in the fact that friction is reduced to an absolute minimum, there being only one packing-box, and resistance of gearing is nil, because no gearing is used.

To test the real efficiency of an elevator, the pressure, volume and load must be *measured*. Opinions and assertions respecting consumption of water are of no value. The amount of work done by an elevator in comparison to the power used varies as much as 35 and even 40 per cent; that is to say, 100 pounds of water pressure will raise from 50 to 85 pounds of load, according to the perfection of machinery.

An easy rule for ascertaining the quantity of water used is, multiply the area of the ram by the stroke, both in inches, and divide by 231. Roughly speaking, a six-inch ram equals $1\frac{1}{2}$ gallons per foot, and a seven-inch ram equals two gallons per foot.

These elevators have been erected in San Francisco up to 83 feet in height and from 1 to 60 tons in capacity.

The sole agents and manufacturers for this coast are Messrs. W. T. Garratt & Co., Fremont and Natoma streets, San Francisco, who have acquired all rights, title and interest in the patents.

THE fire at the Smithfield mine, Nanaimo, is still burning, but is gradually being subdued. The fire engines are pouring water down the slope and playing on the fire. The mine will probably be closed for several weeks and between 200 and 300 men are out of work. If the fire is not soon put out it is thought that the mine will have to be flooded, which would cause a much greater delay.

THE Montana Mining Co. has paid so far in dividends \$2,149,000, of which \$534,600 has been disbursed this year.

MECHANICAL PROGRESS.

A Steam Boiler That Cannot Explode.

M. Serpollet of the French Society of Civil Engineers has invented a steam boiler which, he claims, cannot explode. A boiler of this construction was recently submitted to an examination by the Society of French Engineers, who report that they found the piston, pump, cylinder, valves, etc., in perfect shape and good condition after several months' constant use. The boiler consists simply of a solid drawn steel tube which has, with the exception of its two ends, been rolled out flat, so as to leave in it a channel only 0.1 to 0.3 millimeters wide. The tube is then coiled spirally, and its inner end is bent up vertically to receive the steam pipe, while the feed pipe is screwed into the outer end of the spiral. This spiral-tube boiler is placed into a furnace which may be of the slow combustion type, and there is no need for either stop-valve, blow-off cocks, gauge-glass, or safety-valve. The feed-water, upon entering the narrow channel within the tube, is instantly converted into steam, and issues perfectly dry. The inventor claims that, owing to the great velocity with which water and steam must pass through this novel boiler, there is no possibility of scale accumulating. The calcareous salts held in solution in the water, which at first sight would appear to be highly detrimental to the proper working of the boiler, are, however, reduced to an impalpable powder and really act as a lubricant.

Suppose that a boiler of one-horse power is made of a tube 6 ft. 6 in. long, $4\frac{1}{2}$ in. high, and seven-eighths of an inch thick, having a total weight of 70 pounds, and giving a heating surface of say $5\frac{1}{2}$ square feet. As to capacity of tube it may be estimated to be equal to anywhere in the region of a cubic inch, and it will evaporate 45 pounds of water per hour, with a consumption of nine pounds of coal. The supply of steam to the engine is regulated by regulating the amount of feed-water sent into the boiler, and for this purpose the inventor arranges the regulator of the engine either to act upon the waste-cock of the feed-pump, or upon a sliding block, by which the stroke of the feed-pump is altered. There being practically no water in this boiler, the regulation is said to be as precise and quick as with the usual types of engines. To stop the engine it is only necessary to close the cock on the suction pipe of the pump, or open the waste cock fully. A few days after M. Serpollet had brought this boiler before the Société des Ingénieurs Civils, he showed the application of it to a steam-driven tricycle in the streets of Paris. The boiler was carried behind the axle of the main driving-wheels, and the engine was fixed under the rider's seat, which also contains a supply of water and fuel. A speed of $6\frac{1}{2}$ miles an hour was attained over roads having 1.5 per cent grades. The weight of the tricycle in service, but without the rider, is $3\frac{1}{2}$ cwt.

RELATIVE ADVANTAGE OF CAST AND WROUGHT IRON RADIATORS.—Tests have been made by Mr. Wm. Anderson, M. Inst. C. E., England, with cast and wrought iron surfaces in pipes of different diameters and different thicknesses apparently, as the pipes were ordinary four-inch cast iron and two-inch wrought iron pipes. Thus, temperature in pipes, 190°, in room, 60°; difference, 130° F.; results, 232.7 units of heat per square foot per hour for cast-iron pipe and 356 units per square foot per hour for wrought-iron pipe. Another: temperature in pipes, 160°; in room, 60°; difference, 100° F., 147.1 units per square foot per hour for cast-iron pipes and 225.2 units per square foot per hour for wrought-iron pipe. The cast-iron pipe, of probably twice the thickness, gave out 53 per cent less units of heat, from which it can be seen that the thickness of the metal in radiators is of great importance, and that if the cast-iron pipe had been the same as the wrought iron, which thickness is attained in numerous cast-iron radiators, a much different result might have been the consequence. These figures also show that the emissive powers of surfaces do not increase in the same proportion directly as the difference of temperature, as it may be observed that the power of emission varies from 9 to 10 per cent at the given temperatures. Mr. Anderson states, "the rate of emission for differences of temperature of 200° and 100° differed by as much as 22 per cent. At 200° there was 22 per cent more heat given out per square foot per difference of degrees per hour than at 100°." Practically, the difference between wrought and cast iron of the same thickness is not of much importance.

AN ANTI-FRICTION JOURNAL.—There was recently a very interesting exhibition made in Boston of the results of the long running of one of Tripp's anti-friction journal roller bearings. One year ago, according to the *Commercial Bulletin*, a car of the Consolidated road was equipped with this bearing, and has been in constant use ever since, covering about 100 miles a day. During this time the bearings have not been touched or oiled, and there was consequently great curiosity among those interested in the journal, and the railway people, in the taking of one of the bearings from under the car. It was found in perfect condition, and showed but the slightest possible wear in a few parts and none at all in most. The Tripp Company had warranted the bearing for a year, but

it was evident that it would have run much longer than that without attention, and that its life without oiling would be practically the same as the life of the wheel, or from two to three years. The bearing is constructed on an entirely new principle, by which the axis of the rolls are always kept in line with the axes of the shaft. The company claim that recent tests demonstrate a saving of from 30 to 70 per cent over ordinary journals. The journal-boxes are dust proof, and one lubrication answers for a year's service.

SWORD-BLADES ARE MADE AND TEMPERED so that they will chip a piece out of a stone without showing a nick upon their edge. This information is given by a correspondent who has been through the great sword manufactory at Solingen, Germany. He writes to a Pittsburgh paper a long description of the methods used there. The steel, he says, is cut from bars into strips about $2\frac{1}{2}$ inches wide, and of the required length, by a heavy cutting machine. These are carried into the adjoining forgeroom, where each piece is heated white, hammered by steam so that about 20 blows fall upon every part of its surface, and then thrown into a harrel of water. Afterward these pieces are again heated in a great coke fire, and each goes through a set of rolls, which reduce it to something like the desired shape of the weapon. The rough margins are trimmed off the piece of steel in another machine, and there is left a piece of dirty, dark-blue metal shaped like a sword, and ready for grinding. This is done on great stones, revolved and watered by machinery, the workmen having to be the most expert that can be obtained, as the whole fate of the sword is in their hands. It is afterward furnished on small wheels managed by boys from 12 to 16 years old, and when it has been prepared to receive the fittings of the handle is ready for the testing, which has to be done with great care. Any fault in the work is charged to the workman responsible for it, and he has to make it good. It is said that any blade which will not chip a piece out of a stone without showing a nick on itself is rejected.

ENGLISH AND AMERICAN MACHINE TOOLS.—An American machine tool manufacturer has just returned from a trip to Europe, where he says he did a great deal of pure loafing, but not apparently without an eye to business. He finds a great difference in machine tool processes in England, as compared with this country. He looked through a number of establishments, and nowhere saw a quick-return arrangement on any planer or slotter, and hardly anywhere did he observe cut gears in use on machine tools. Other differences were noticeable, proving to his mind that an equal number of workmen operating American-made tools logically ought to do more work in a day than the same number of men operating English-made tools. He says an English concern had just got in about \$10,000 worth of machine tools, built by an American manufacturer, and took considerable pleasure in showing them off to a prominent English builder, with the pleasant suggestion that there were some tools worth copying! Modesty forbids his mentioning the name of the American builders. —*Am. Machinist.*

NEW APPARATUS FOR TRANSMITTING FORCE.—A French engineering professor, M. Raymond Sayers of the Louvain University, has invented an apparatus for transmitting force between bodies moving at greatly varying velocities without accompanying disadvantage of a violent collision. The method consists in furnishing the contact surface with steel bristles, which, by the entanglement of their "bristles," are enabled to grip one another. In this way the swiftest motion may be imparted gradually to a perfectly stationary body and a maximum of shock can be arranged for, which can never be exceeded, be the impelling force and velocity what they may. The inventor has in view chiefly the requirements of quickly moving lifts, railway trains and other bodies moving at high speed and with great momentum; and if it be possible to produce in this way an effective brake, or to obtain an automatic working of railway signals, much will be done to minimize some of the most serious perils which at present threaten life and limb to industrial occupations.

MORE ABOUT COMPRESSED PAPER FOR AXLE BEARINGS.—Further experiments have been made in the use of compressed paper for bearing in place of brass, etc. The parchment is strongly compressed before being used, and it is dried to prevent subsequent shrinkage. Wooden rings are placed on the outside of the bearings, fitting the collar of the journal. An emulsion of water and oil and all the mineral oils are used as lubricants. The parchment soon becomes impregnated with oil, and is able to go a long time without a renewal of lubrication. It is between the body of the journal and the thin edge of the parchment segments that friction takes place. The claim is made that the compressed paper bearings make a tough material that is superior to metal. Such bearings are also in use in a German sawmill, with satisfactory operation.

THE NEW SIX-INCH GUN, throwing a 100-pound projectile and penetrating 13 inches of plating at 1000 yards, is a gun of efficient power to deal with almost anything built or huddled. It may fail to penetrate the strong patch, but it will knock any other part of the ship, and most of the men, to pieces.

SCIENTIFIC PROGRESS.

How Hot Waves are Formed.

The present heated spell has drawn attention to the periodical fluctuations of heat energy, which produce what is called "hot waves." These waves have sometimes been assigned to some occult influence of the moon, but a careful and rigid examination of that theory by meteorologists has resulted in proving it fallacious.

Other causes for hot spells, therefore, must be investigated. Of these, the influence of prevailing winds for any region in summer is the most important. A glance at the map, showing the physical conformation of the United States, will exhibit the long valley of the Mississippi river extending from the Gulf of Mexico to the Great Lakes.

In the Gulf, under the fierce rays of radiant energy from the sun, the evaporation is, comparatively speaking, enormous. The hot winds from the South bring northward immense quantities of aqueous vapor, held in solution, so to speak, by the atmosphere. On the other hand, the winds from an area of high pressure, which generally move southward, are cold and dry. The high areas are developed in the British Possessions, and invariably move into the United States from Manitoba and that section contiguous to it.

Owing to causes easily ascertained as astronomical principles, the great southerly drift from the Gulf prevails in the central portion of the United States in summer.

If any observer notes the wind direction and the humidity of the air for a few days in July and August, and finds a steady current from the South, with slowly increasing humidity, he can easily predict "a hot spell" as rapidly approaching. To the ordinary observer, it is marvelous that such oscillations occur while the sources of all heat appear to remain uniform.

The sun, the source of heat, does not blow hot and cold. It remains above the horizon, radiating its energy outward to all space for nearly the same time each day, yet one day is cool at a temperature of 74°, and in a day or two more we are sweltering in the torrid-zone temperature of 100°.

One of the greatest factors in producing this wide diversity in temperature is the relative humidity or absolute amount of moisture in the air. This vapor is a gas and invisible until condensed into clouds, rain, etc.

The heat received from the sun suffers absorption in its passage through a moist atmosphere, and of that portion of it which comes to the earth some is radiated back by the earth to the sky. This is stopped and absorbed by the aqueous vapor, and very soon the air is superheated. Thus the temperature of the air is raised excessively by the presence of the invisible vapor, and these conditions produce what are denominated, very incorrectly, as hot waves.

The conditions for the continuance of the heated trend depend on the southerly winds—vapor-laden and themselves hot—and also the absence of the cooling influence of the great northerly drift from Manitoba.

When the daily weather reports show an area of high barometric pressure, advancing southward toward the Great Lakes, the influence of the cold, dry winds, which accompany its progress, change all this and make a "cool wave."

The agricultural section of the community should notice when the peculiar sensation of sultriness and oppression becomes felt, and the air is superheated as well as saturated. This is the time of danger, as the atmosphere is liable to assume what is called "an unstable equilibrium," and destructive storms ensue owing to the abnormal state of the air. —*Cincinnati Enquirer.*

The Huge Electro Magnet.

This huge electro magnet which we have already noticed as having been formed by winding two cannon placed side by side at the U. S. Naval Station at Willet's Point, is still a thing which attracts much scientific interest. This magnet has been formed by connecting two 15-inch Rodman guns at the trunnions and winding them with about four miles of old insulated torpedo cable. With this apparatus and the use of a 30-horse power dynamo, an electro magnet of enormous power will be obtained. The wire with which it is wound will soon be increased from four to six miles in length. This apparatus furnishes cheap and ready means for making many really valuable and interesting experiments.

The tests have not yet gone so far as to give quantitative results. In fact, only a preliminary trial of the magnet (not yet fully wound) has been made, and its whole strength cannot be measured until it has been more firmly anchored. But it shows a tremendous attraction for all things ferruginous.

One of the peculiar phenomena observed is, that a 15-inch shell, weighing 320 pounds, placed in the muzzle of one of the guns is violently forced out when the current passes through the wire, yet it does not leave the gun, but swings around to the lower side of the muzzle, where it remains hanging, like a carpet-tack on an ordinary magnet, even with a second shell of equal weight depending from it. Twenty men cannot pull an iron rail from the muzzle of the gun while the current is passing.

Major King has had an armature made of 11-inch plates, built up to a thickness of five or six inches, so as to get a more suitable mass for the giant to work on, and a five-ton Duckham dynamometer fails to register a force sufficient to remove it.

Seemingly impossible experiments have been made with it. A handful of small nails thrown with force away from the magnet fly back and attach themselves to it. Another experiment was made with cannon-bells.

The most amusing experiment was made with a sledge-hammer. When one tried to wield it in a direction opposite to the magnet, he felt as though he were trying to hit a blow with a long feather in a gale of wind. There is nothing in the world that could take the conceit out of a strong man so much as this simple experiment. Another amazing test was made with a number of carpenter's spikes. A spike was put lengthwise on the end of the magnet, then another spike was attached to the first, and so on until a line of them stood straight out from the magnet at least four feet in length. Aside from their interest to science, the experiments were so novel and startling that they were entertaining even to those who were not interested in the wonderful developments of electricity.

An interesting and most satisfactory experiment was made with an American non-magnetic watch. While an ordinary watch was instantly stopped when brought near it, the non-magnetic watch was not affected when placed within the magnetic field. This test was a very satisfactory one, considering the importance that railroad employes should be provided with watches that cannot be influenced by the magnetism which is always largely generated by the masses of iron about the train and the friction of car-trucks, wheels, etc. The watch was held by its chain for ten minutes within the most intense portion of the magnetic field, yet it did not vary the hundredth part of a second. The men who held it said that he himself was conscious of the influence of the magnet. He could feel as he held the watch by the chain that some other power than his was keeping it suspended.

We shall await with much interest further results from this monster magnet, by far the heaviest and strongest ever constructed.

THE NEW FRENCH ARMY RIFLES.—The absolute mean deviation of the new magazine rifle for the French army is only a little over a foot at 1000 yards. Using a fixed sight, a man can hit struck up to 470 yards, as the trajectory is remarkably flat. The authorities do not at present propose to make use of a smokeless powder, as the keeping properties of these compounds in warm and damp climates have not as yet been tested. Lobel rifles are being manufactured for the French army at the rate of 1600 a day. The new powder, which it is proposed to use in future conflicts, is not only smokeless, but almost noiseless. The reports produce no noisy confusion in the ranks and the powder is far more effective than anything heretofore used in small arms of any kind.

A NEW MAGNESIUM LIGHT.—At a recent meeting of the Photographic Section of the American Institute there was shown a new magnesium light, which employed powdered magnesium instead of wire, and burned it in a strong alcohol flame instead of upon "flash cotton," as is now used. The advantages are that there is only about one-sixth as much of the metal needed; that there is proportionately less smoke made to annoy those who are present, and that the duration of the flame may be controlled at will, or it may be repeated as desired. The safety is undoubted and the convenience very great.

THE ELECTRIC LIGHT IN FISHING.—The electric light is now being used in fishing to attract the fish to a particular place to facilitate their capture. The principal trouble has been that the wires leading to the submerged incandescent light are apt to become fouled with the fishing appliances or with the cable of the vessel. To prevent this, Regnaud has out a primary battery which can be tossed overboard and regained when desired, the lead being upward from this battery to the lamp.

ELECTRICAL RESISTANCE ALLOY.—An alloy, the electrical resistance of which diminishes with increase of temperature, has recently been discovered by Mr. Edward Weston. It is composed of copper, manganese and nickel. Another alloy due to the same investigator, the resistance of which is practically independent of the temperature, consists of 70 parts of copper combined with 30 of ferro-manganese.

DEVIATION OF RANGE.—The deviation of range in guns when fired either north or south in the direction of the meridian has now become important in long-range guns. When a gun is fired due north or south which has a range of 11 miles, a lateral deviation of 200 feet must be taken into account for the difference in rotating speed between the spot where it is fired and the spot where the missile will strike.

A SHIP'S POSITION-FINDER.—The Watkins position-finder, for which the British Government paid \$225,000, has been proved to be very efficacious in finding vessels and like objects that could not be seen from the battery which was aimed at them, and such objects were struck very frequently by the guns from each battery, although invisible therefrom.

USEFUL INFORMATION.

The Old-Clothes Man.

There is a possibility that a man may wear out a suit of clothes several times. As soon as the wool is shorn from the sheep's back it is packed in bags and shipped to wool-brokers, where it is sold to the mills and manufactured into cloth, after being carefully graded and scoured. The product of the mill is sent to the commission-houses, where it is sold to the clothing manufacturers by the piece. If the cloth is of cheap quality, it is cut with a knife, only first-class cloth being honored by the shears, and is then sent to the small manufacturers and tailors to be turned into clothing.

When the work is finished it is examined by a board of examiners hired by the wholesale houses for this purpose, and, if passed by them, is placed in stock ready for sale and shipment.

The retail trade passes the garment into the hands of the consumer, who wears it out and then gives it away to some poor man or sells it to the second-hand dealer. The second-hand man cleans and repairs his purchase and sells it again for about one-third of the original cost. After being worn completely threadbare, it becomes the property of the tramp or does property for a scarecrow. When finally reduced to rags, it falls a prey to the rag-picker, who realizes on a small margin from the rag-dealer. As soon as a sufficient quantity of rags have been collected, they are shipped to some one of the many shoddy-mills in the country. There the rags are assorted and cleaned, and then ground into a pulp, which is afterward carded and spun into a filling commonly used for inferior cloth.

It finally reappears in the hands of the commission merchant as a poor grade of woolen goods, is again sold to the clothier and goes through the same operation as before. So in all probability, young man, you are walking about the streets chasing a fleeting item in a brand-new suit of clothes, the best part of which is an old overcoat or hat discarded by yourself two or three years ago.

HOW THE WORLD IS FED.—About half the inhabitants of the world work to supply the other half with food. "Even the oldest and best-informed man the trade," said an experienced salesman in the grocery business, "cannot begin to tell you anything about the wonderful extent of the traffic in food. Figures don't seem to express the thing so that anybody can realize how enormous the business is. Now everybody knows that corn makes only a small part of what anybody eats. By that it is meant that nobody eats corn enough to make it a principal article of diet. Yet there is one establishment in Maryland—a corn factory they call it—where there are 100,400 cans of corn a week put up and sold. Now consider that this is only one establishment out of hundreds in this country, and thousands in the world, where food is put up in cans. Then think that corn is only one small item of food, even among the canned goods. And then remember that canned goods are merely a fraction of the food supply, and you will be ready to acknowledge that the food industries of the country are too great to be readily grasped by the imagination. More than three-fifths of all the workers of the world are engaged wholly in raising or handling food."

A REVOLUTION IN GAS BURNING, says the New York Tribune, is proposed by Charles S. Upton, manager of the Rochester Lamp Company, New York City, who has patented, at a cost of \$50,000, in all countries in the world, a new gas-burner. The "Niagara" burner, as it is termed, sheds a soft lamp light of 100-candle power, consumes six feet of gas an hour, is simple in construction, and will be made to fit any gas fixture. The secret of the patent is in admitting the flame to a process of combustion through perforated brass fittings after it leaves the jet. One hundred men are at present employed making a stock of the new burners, which will be on sale soon at the price of \$1.50 each.

EXPLOSIVES IN MINES TO BE DONE AWAY WITH.—It has been proposed to do away with the use of explosives in mines where their use is attended with danger, and substitute the lately invented cartridge, one portion of which is filled with a mixture of finely divided zinc and zinc oxide, which collects in the condenser of the zinc retort, while the other part is filled with diluted sulphuric acid. According to the requirements in this case, the cartridge is put in its intended place, and then, by suitable mechanism, the acid is allowed to flow into the zinc. Hydrogen is then evolved, and by its expansive force the rock is broken down without combustion or violent explosion.

A MIXTURE of 10 parts of tin putty, 8 of prepared huckhorn, and 25 of spirits of wine, makes a good compound for taking the rust off drawing instruments, and will not injure them. They should be rubbed with soft blotting-paper after this compound is applied.

TO KEEP A STEEL PEN IN ORDER.—Steel pens will rust, no matter how carefully they are cared for, and they will not write well until the rust is removed from the point. This may be done by simply using a round slate pencil to

scour the rust from the inside, while the same instrument may be used to cleanse the outside of the pen. A very small quantity of rust will prevent the free flow of the ink. New pens, before using, may often be improved in the same way.

THE INVENTOR of the Volapuk language, Johann Martin Schleyer, Father Schleyer as he was called, died in Paris on the 9th inst. He was born at Oberlanda, Baden, in 1831, and educated for the Catholic priesthood, which he entered in 1856. He had a passion for studying languages, and acquired a knowledge of about 50 languages and dialects. In 1859 the idea of a universal, or rather a neutral, language possessed his mind, and during March of that year he constructed its entire grammar. He devoted his entire attention to the propagation of the Volapuk idea, and was the author of numerous writings on the subject.

ESTIMATING THE NUMBERS IN A CROWD.—It is curious to note the differing estimates put upon the size of meetings by the reporters of newspapers. If a man read only one paper he might be contented and believe that he had obtained the exact facts. The moment he looked at another he is forced to revise his judgment and strike an average between them. The attendance at a recent meeting in New York was variously estimated by the different journals of that city at from four to fourteen thousand. The average of 13 estimates was 6055, which careful judges have pronounced as a very close approximation to the actual attendance.

EATING HORSE MEAT.—Pandora, the famous stepple-chaser, was shot a few days ago on account of incurable lameness, and some of the choicest steaks cut from the carcass were served up at the Philadelphia Club as "filet a la Pandora" to several guests, Dr. Rush S. Huidekoper, her owner, and the cooks being sworn to secrecy. The guests pronounced the meat very toothsome, but were much surprised on learning that they had been eating horse meat. The joke, however, was enjoyed.

GOOD HEALTH.

Male Versus Female Brains.

Leaving the physical side, let us now compare the mental caliber of the two sexes. The first argument always brought out by the medical profession is the *a priori* one derived from brain weight. A woman's brain weighs less than a man's brain; therefore, it is argued, she must be inferior to him in mental power. In the first place, however, it is yet by no means certain that a large brain is superior to all smaller brains. Brain power depends, authorities tell us, first, upon quality; secondly, upon activity; thirdly, upon size.

The man who possessed the heaviest brain yet weighed was an American blacksmith, who does not seem to have been otherwise remarkable, even for the excellence of his iron work. However, admitting that if the quality and activity be equal, a large brain is superior to a small one, it is still uncertain whether or not women possess smaller brains than men in proportion to their size. When we consider how much of the brain is occupied in controlling muscular movements, it is obvious that the larger animal needs a larger brain to exert the same mental power than the smaller animal.

How much less, if any, the female brain weighs in proportion to size, has never yet been calculated. Even the average weight of the female brain itself is not exactly known, as every experimenter gives a different result. Parchappe estimates that the proportion of the female to the male brain is 999 to 1000. Surely the difference of stature would allow a difference of weight greater than this? Other inquirers give different figures. One of the best-known tables is quoted by Prof. Huxley in his "Man's Place in Nature," where the result seems adverse to feminine pretensions. Allowance must, however, be made for the following considerations: In the case of men, a larger number of brains were weighed, among which were included the brains of many celebrated men, especially collected for this object. The women's brains were much fewer in number, taken from the lowest source, and did not include the brain of one woman of distinction. A comparison of such material is obviously unfair. Yet among the female brains, the heaviest brain known to science up to that time was discovered. It weighed several grammes more than the brain of Olivier. Since that time, however, though great pains have been taken to ascertain the brain weight of celebrated men, not one record exists of the brain weight of famous women. The brain of George Eliot was especially remarkable. The following passage occurs in her life: "Mr. Bray, the enthusiastic believer in phrenology, was so much struck with the grand proportions of her head that he took Marian Evans up to London to have a cast taken. He thinks that after that of Napoleon her head showed the largest development from brow to ear of any person on record."—*Woman's World*.

CURING WHOOPING COUGH.—Babies are cured of whooping cough and typhus fever by the eucres at the gas-purifying establishment at the eastern end of Chestnut-street bridge. The cure is free and does not cost the city anything. The babies are brought there by their friends

and their mothers, and are placed over the purifying-pan, from which there is a constant escape of ammonia. The vapors make the youngsters cough until their little heads threaten to drop off and the big tears gather in their eyes. The more they cough, however, the better, because they are coughing the disease away. Frequently there are dozens of babies and young children around the pans, all coughing and making a great bluster and splutter. James Gilmore, one of the attendants at the pans, has been at the purifying-house 53 years, and he is a great friend of the sick babies and their mothers. He says that the whooping cough appears to be very bad about the city now, judging from the number of his young visitors. The ammonia treatment for this disease is generally recommended by Philadelphia physicians, and is very successful.—*Philadelphia Record*.

What to Eat.

The following table, compiled by Prof. G. W. Conklin, is eminently and practically useful, presenting as it does at a glance the available percentage of nutritive elements contained in the leading staples used as human food:

Milk	7	Boiled Mutton	30
Cabbage	7	Oatmeal Porridge	75
Eggs	13	Rye Bread	79
Apples	10	Boiled Beans	87
Peaches	20	Boiled Rice	88
Codfish	21	Barley Bread	88
Potatoes	22	Wheat Bread	90
Fried Veal	24	Corn Bread	91
Roast Pork	24	Boiled Barley	92
Roast Fowl	26	Butter	92
Roast Beef	26	Boiled Peas	93
Grapes	27	Olive Oil	95

It will be seen that the most wholesome and nutritious articles, as oatmeal, flour, peas, beans, rice, crushed wheat, corn, bread, etc., are vastly superior to beef in supplying effective ability to labor, besides being obtainable at about one-third the price of the latter. After all that can be said, pro and con, touching a vegetable diet, certain we are that the average man who limits himself to a well-selected regimen of vegetable food will, accidents aside, go through life with a clear mind in a healthy body, will sleep sounder and come nearer the allotted age of threescore and ten, having a better digestion and fewer headaches than any man who indulges in roast beef with the usual variations.

THE TOMATO IN BRIGHT'S DISEASE.—When Thomas Jefferson brought the tomato from France to America, thinking that if it could be induced to grow hountfully it might make good food for hogs, he little dreamed of the benefit he was conferring upon posterity. A constant diet of raw tomatoes and skim-milk is said to be a certain cure for Bright's disease. General Schenck, who, when Minister to England, became a victim to that complaint, was restored to health by two years of this regimen. With many persons the tomato has much the same effect upon the liver as a small blue-pill, and whether it is that as a people we are less bilious than in former years, or that the doctors of the new school practice less severe remedies than did those of the past, it is certain that mercury is prescribed with less frequency than of old.

DANGER IN TURNING BOOK LEAVES.—People who indulge in the elegant habit of wetting the forefinger before turning the leaf of a book will do well to note the report of the authorities of Dresden, who have been investigating the question whether circulating libraries are a medium for the spread of infectious diseases. They rubbed the dirtiest leaves of the books, first with a dry finger end then with a wet, microscopically examining the product in each case. In the first case scarcely any microbes were found on the finger; in the second case, plenty. Though all these appeared to be of a non-infectious character, the committee winds up with a recommendation to readers not to wet the finger in the month for the purpose of turning over the leaves.

HOW SCARLET FEVER MAY BE DISTRIBUTED.—The following case shows how scarlet-fever poison is distributed. A little girl, eight years old, living at Fortesse Monroe, was attacked with scarlet fever. For a long time no possible source of contagion could be discovered, but at last the attending physician learned that one of the house servants had nursed a case of scarlet fever in a distant city just about a year before. After the case terminated she packed some of her things, including some clothing then worn, in a trunk, and left the place. A year later she had the trunk sent to her, opened it and took out the contents, the little girl being present and handling the things. Very soon after the latter was attacked.

EFFECT OF EXCITEMENT ON LONGEVITY.—The question as to whether or not excitement shortens life is being agitated, and it is held that anything which quickens the action of the heart, any kind of excitement, taxes and reduces the storage of life. Almost every one knew this long ago, and it is only recently that the matter has been considered in the light of percentage.

CANNED GOODS RENDERED DANGEROUS BY FIRE.—Three families have been poisoned in San Diego through the eating of canned goods saved from a recent fire. They had eaten of canned salmon and oysters which had become impregnated with oxide of tin and lead by the action of the fire.

More Coal in Oregon.

Coal mines throughout the Northwest are attracting much attention of late, and many discoveries and developments are being made, and the quality of different veins of coal is being tested. A test of the coal from the Turtle River mine was made on the Portland & Willamette Valley railway. This mine is situated on Turtle river, Washington Territory, which runs into the Cowlitz about 20 miles from its mouth. It is one and a half miles from the Northern Pacific railroad and two miles from the Cowlitz, at a point to which it is navigable ten months in the year, and with slight expenditure the river could be made navigable during the entire year to a point opposite the mine. The company has been working on the mine for some time, and has run in two tunnels, one 75 feet long and the other 200 feet long, both striking the veins of coal. Mr. James Williams, an expert who examined the mine, reported that there were two veins of Cannel coal underlying the whole property. The upper vein is three feet two inches thick. It is clean and hard and has good rock for roof and floor. The second vein is as good in quality as the first. The veins will each produce about 3500 tons of coal to the acre, which he estimated could be loaded on the cars for 75 cents a ton.

An analysis of the coal was made by W. G. Jenne, who found it to contain: Fixed carbon, 82.25; combustible gases, 52.21; ash, 7.54; moisture, 8.

The test was made under the supervision of Superintendent John McGuire. In answer to questions of a reporter, he said: "The coal is far ahead of any produced here which I have tried. It compares favorably with the famous Kenewee coal of Illinois. It is clean to handle, makes little or no smoke, burns clean, with but little ash or clinkers. I handled the throttle for 15 years in a coal country, and know what coal is, and can say that this is the best locomotive coal mined in the Northwest which has come under my notice."—*Portland Oregonian*.

The Strength of Ropes.

The quality of workmanship, strength, extensibility and elasticity of round and flat ropes of hemp and aloes, and of iron and steel wire, have been experimentally investigated by M. A. Duhoul, and the results of his experiments published in the *Bulletin de la Société d'Encouragement des Arts*, Paris. In his experiments M. Duhoul used a horizontal hydraulic press and a weighing apparatus consisting of a steel yard and sliding-weight, by which tensions of from 1 to 130,000 pounds could be recorded. For higher pressures a gage on the body of the press was used. Specimens were fastened by winding each end on a grooved pulley of special construction. The usual length of specimens for testing was 13 feet.

The results of all the tests gave for the average tensile strengths of ropes the following:

	Lbs. per sq. inch
White hemp	10,500 to 11,200
Tarred hemp	7,700 to 8,400
White manila	9,800 to 10,600
White aloes	5,600 to 7,000
Flat, tarred hemp or manila	7,900 to 8,400

A factor of safety of four or even three, in some cases, is considered safe for ropes.

A rope of unannealed wire has an ultimate tensile strength of about 55,000 pounds per square inch of section of metal; when annealed the ultimate strength is reduced to about 45,000 pounds, but the elongation is nearly doubled, being 12 to 15 per cent in annealed wire. The heat wire ropes for mining purposes have a much higher tensile strength. Another writer on the same subject says that the tensile strength of a wet rope is only one-third that of the same rope when dry, and that a rope saturated with soap or grease is still weaker.—*Chicago Journal of Commerce*.

ROMITE VS. DYNAMITE.—Some comparative experiments have recently been made in Sweden with dynamite and romite, the new explosive invented by Herr S. Joherg, a Swedish engineer. The romite used was of the ordinary kind manufactured in Sweden, and the dynamite was of M. Nobel's usual make. For the experiments lead cylinders three inches in diameter and eight inches in length, with a cavity in the center one inch in diameter and 4 1/2 inches in depth, were used. Cylinders were charged with romite and dynamite respectively, the charge being 230 grains. Having been provided with ordinary fuses, the cylinders were tamped with dry sand and hermetically sealed with a lead plug. They were then firmly wedged in a strong iron frame, and the charges fired. It was found that the average of ten romite cylinders in volume after explosion showed 22.2 cubic inches, against 42 1/2 cubic inches of those charged with dynamite. This shows that the explosive force of dynamite was nearly twice that of romite. The specific weight of dynamite being also greater than that of romite, the former possesses higher concentration, which is a great advantage with explosives. The romite manufacturers, however, say that these experiments are far from being conclusive as to the relative merits of the two explosives, as, in order to give the greatest explosive force to romite, it must be inclosed in a solid case, which the soft lead cylinder is not considered to be. Further experiments with the two explosives are to be made in such a manner as may be desired by the makers of romite.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

QUARTZ MOUNTAIN.—Amador Ledger, Oct. 16: Machinery is fast arriving and being placed in position for the purpose of working the Quartz Mountain Overplus. Work has been commenced on the reservoir with a large force of men.

MINING EXCITEMENT.—There is much excitement in mining matters about six miles above Sutter creek, on the Volcano road. A few weeks back some prospectors named Leggett and Mandich Bros. discovered a ledge in that vicinity showing plentifully in free gold. They did some work on it and the quartz continued as rich as ever. They have bonded it to S. D. R. Stewart for \$10,000, and the new owner is now preparing to erect a six-stamp mill on the property. The same prospectors have also discovered another vein a short distance above, equally rich, and estimated from samples which have been shown us to yield over \$300 per ton. The whole country around has been located; one man having recorded ten locations.

FROM SUTTER CREEK.—Cor. Amador Ledger, Oct. 13: Repairing the Wildman shaft is completed and extracting rock is now in order. The mill was started a week ago and they expect to run it regularly. The ore is thought to be of a good paying character. There has been considerable excitement about the North Star mine within the past week; all hands being on a strike. They claim that it is customary in most mines to work the men till 12 o'clock Saturday night, and allow a shift for it, and in case, they work all night Saturday they are entitled to a shift and a half. The company, however, is only willing to pay for the work they perform. They have gone to Amador City, and succeeded in finding a set of men who have gone to work on the company's terms.

Calaveras.

THORN.—Calaveras Prospect, Oct. 13: Work on the Thorn mine is progressing finely under the management of P. S. Buckminster. Altaville and Angels have the appearance of an old-time mining camp. Everybody has plenty of money and men are as thick as bees.

Inyo.

CLOSED DOWN.—Inyo Index, Oct. 10: The Panamint Co. completed the run at their mill last week, and closed down for the season.

Los Angeles.

SAN FERNANDO DISTRICT.—Newhall Sentinel, Oct. 4: Newhall is in what is termed the San Fernando mining district. It extends from a line directly east from the tunnel about ten miles, taking in the Soledad canyon on the north. George Camp-ton is the Recorder. Prof. Von Keith, ex-Postmaster Green and Mr. Sampson, of Los Angeles, were visitors at the Cora Belle this week. The professor made several collections of slate, plumbago and soapstone, and found well-defined tracings of petroleum. A very fine vein of plumbago has been found in the San Francisco Canyon just above the Cora Belle. A company is now being formed to work it. The pulverizer made by J. B. Freeman of Los Angeles is now completed and will be put in operation in another week. It is to crush the clay and dirt before it enters the dirt washer, and will revolutionize mining in this district. At the Cora Belle mine a shoot has been arranged that pulverizes the dirt before it strikes the washer, and excellent results have been obtained. Two washers are now in operation day and night, and some fine gold is being taken out. Engineer Gavin has given his opinion, after having carefully surveyed the ground, that a hydraulic system could be put in at comparatively little expense. A reservoir with a capacity of 16,000,000 gallons can be made by removing only 800 yards of earth, and counting water-pipe, gates, etc., at a cost of \$2000. This will be done as soon as possible. The El Dorado mine, four miles above Clara Belle, has shown good development. A four-foot vein of silver, gold, and a red oxide has been struck, and a force of men is now at work. Richard Kitchline has purchased a fifth interest in the mine with Messrs. Smith and McDuffee.

Mariposa.

DULL.—Mariposa Gazette, Oct. 13: Business is exceedingly dull here at present. Owing to the low stage of water in the river the mill can run but five stamps. There are only ten men employed in the mine. The rock taken from the mine is excellent and no doubt pays well. New attachments are to be added to the mill soon. A new concentrator and two new mortars are on the road, and when they arrive will soon be put in place.

Nevada.

THE BRUNSWICK.—Transcript, Oct. 16: It is reported that the New York Co. prospecting the Brunswick mine in Grass Valley district will settle with their creditors and resume the sinking of the shaft. The plan is to follow the ledge down at least 300 feet more.

THE BANK STILL CAVING.—The 400-foot bank at the Manzanita gravel mine just north of town continues to cave, and another large mass of earth having chipped off Friday evening. There is no danger of the debris reaching the mouth of the entrance to the tunnel through which the drift miners are burrowing under the mountain, as it is over 700 feet from the face of the bank. The stuff now falling serves as a brace to prevent the mountain's weight from squeezing out the strata near the bedrock.

RICH QUARTZ.—At John Bonney's quartz claim on Piety Hill in this city some of the richest ore ever found in that locality is being taken out. The Bonney claim adjoins that owned by John Dower and sons.

KELLEY'S STRIKE.—Tidings, Oct. 13: The quartz strike on Thomas J. Kelley's property on Race street is quite an encouraging one. A six-inch formation, in which there is much solid quartz which shows sulphurets of good quality, lead and a sprinkling of coarse and fine free gold, was uncovered at a depth of 30 feet. Specimens of the ore shown us make the mineral showing above related, while a washing from a few cupfuls of the fine dirt revealed numerous particles of the coarse gold. Taking into consideration the superficial workings

the strike is quite important. With the ledge, water was encountered.

Placer.

VERY RICH.—Placer Republican, Oct. 6: The output of gold from the Brece & Wheeler mine at Bath during the past week has been something phenomenal, even for that rich and steady mine. The working place is about one mile and a half from the entrance to the tunnel, and the breast is probably 40 feet wide and six feet high. The bulk of the gravel is richer than usual, while the bedrock is covered with coarse gold, some of it actually going as high as \$1000 to the pan. The Brece & Wheeler is just now the Bonanza of California.

MAYFLOWER.—Republican, Oct. 10: The second upraise in the big tunnel of the Mayflower mine near Forest Hill was completed last week, and an abundance of very rich gravel was found. The first upraise was made about four months ago at 5200 feet from the mouth of the tunnel. Good prospects were found, but it proved to be too high on the rim. The present upraise is at the 5500-foot point and is 28 feet high from the incline. Supt. Chappellet broke through five days ago and found the gravel exactly the same as in the old Mayflower works three years ago, and prospecting about \$7 to the pan. A telegram received from him yesterday says it is growing richer and richer. At this point, however, the bedrock is still pitching a little to the east, so that the incline is being pushed on its present level about 50 feet further and then another upraise of 20 feet will be made through the bedrock into the channel. There is now no doubt that this third upraise will strike the lowest part of the channel, and the calculations made by Mr. Chappellet and Anthony Clark three years ago will have been verified almost to a foot. When they located the big tunnel in the Consolidated Justice, adjoining the old Mayflower ground, they estimated that it would have to be 5550 feet long and that it would bring them 60 feet under the channel. This low level was adopted so that a branch of the tunnel could be run down stream and all the lower ground be worked. But, to avoid a 60-foot upraise, an incline was made from the tunnel level so that the present works will be reached through an upraise of only 20 feet. This point is in the Consolidated Justice and between 1200 and 1500 feet from the old Mayflower works. The results of the last week are not only a triumph of engineering skill, but another proof of the extent of the main channel down the divide and the richness of the Con. Justice ground.

Shasta.

ORE.—Shasta Courier, Oct. 16: Supt. Everett, of the Little Nellie mine on Iron mountain, was in town Thursday. Their tunnel has passed through one ledge and tapped a second one. A lot of the ore has been sent below for milling test.

MILL.—The Utah Co., which owns the Florida group of mines, Old Diggings, is putting up a ten-stamp mill. The ore there is rich, but it cannot be successfully worked by the usual millio process; so say men who have had experience with ores of that rich district.

Sierra.

A BIG ENTERPRISE.—Sierra Tribune, Oct. 12: At the Red Chief quartz mine, six miles below Alleghany, an Eastern company is erecting a 40-stamp mill, and if everything goes well the stamps will be dropped about Dec. 1st. It is also proposed by the company to increase the plant next spring to 100 stamps. About 25 men are employed there at present. The vein at this mine is an immense one, and it is believed that it is destined to develop into a fine paying property.

THE SALINAS AND MERCER MINE.—At the Salinas and Mercer mine the work of pushing ahead the lower tunnel is progressing smoothly, and it is expected to encounter the vein in that quarter soon. When water comes the mill will be started up. By another season it is proposed by the company to build a reservoir which will hold enough water to last all the year. The directors held a meeting this week for the transaction of business.

THE KENTON MINE.—The Kenton mine on Kanaka creek, near Alleghany, is now owned by Horace Brown, and he and Jim Clinton are working there and running four stamps out of the 12-stamp mill. They have sunk 25 feet on the winze in tunnel No. 1. The ledge is six feet wide and assays from \$10 to \$50 a ton. The ore mills about \$10 a ton.

COLOMBO.—The work of hauling the Colombo mill over to the Buffalo mine was begun last Tuesday. Active work is going on at the mine in preparing to put up the mill.

Siskiyou.

QUARTZ.—Yreka Journal, Oct. 10: Mr. Geo. Clawson, who owns a fine ledge at Mill creek, near Scott river, was in town last week and showed us some exceedingly rich specimens of quartz, having pounded out some \$2500 from a small lot of such specimens. His ledge runs from 18 inches to four feet in width, throughout all of which gold can be seen with the naked eye. He is now prospecting with a small mill and will soon make arrangements to put up a large mill, as the ledge is firmly believed to be a permanent one. Mr. Chas. Abbott has been taking out considerable quartz from his ledge on Greenhorn during the past summer, which prospects well. He keeps up expenses by pounding out some of the richest specimens, and as soon as the winter rains commence to furnish water-power for running the custom-mills, will bail it for crushing. Messrs. Mike Finley, Henry Hutchings and Wm. Clark have discovered a rich ledge on the middle fork of Humboldt creek, near the ledge lately discovered by Jagers. They have sunk down about 40 feet and feel confident of finding a permanent ledge, at least they intend to make a thorough test to be sure of it. Geo. Simmons has a force working day and night on a new ledge at middle fork of Humboldt which he calls the Never Sweat mine. He thinks he has found a rich ledge and we hope his expectations may be fully realized. The Schroeder & Werner ledges at the head of Deadwood continue to pay well, with plenty of quartz to keep the mill going day and night, some 23 hands being employed. Next year it is expected the force will be doubled, as the mine will then be opened better for a larger force to work with good advantage.

Sutter.

WORK RESUMED.—Sutter City Enterprise, Sept. 28: The Sutter City M. Co. has decided to continue the work at the mine and has engaged the

services of three experienced miners, who commenced work last week. It is the intention of the company to tunnel under the hill at a depth of 90 feet. Work is progressing slowly at the present time owing to the presence of bad air in the shaft. The miners struck several small veins of coal this week of excellent quality, but in very small quantities.

Tuolumne.

LANE.—Union-Democrat, Oct. 13: The shaft at the Lane mine, Dickson's ranch, is now down 114 feet. The lead averages about 22 inches in width, is heavily sulphuretted and carries free gold. Very little exploration work as yet has been done, and throughout the entire shaft but one short drift has been run. The Bonanza mine, situated in the city of Sonora, is now being energetically developed. The mine is famous for its pockets of free gold, having produced hundreds of thousands of dollars, and especially for its fabulously rich tellurides of gold and silver—richer than those in any other mine in California, Colorado or any other country as far as now known. Tellurides from this mine lately treated by Mr. Louis Blanding gave, per ton, in gold and silver a total of \$65,160—gold, \$60,080; silver, \$5080. The steam Duplex pump recently placed in the mine is working with entire satisfaction. In the rear of the present steam pump a large chamber 9x16 feet has been excavated and timbered to admit the placing of the hoisting machinery. The primary engine on the outside is designed to run both the pump and the hoisting works. Wm. Van Ausdel is running the engine, Harry Medlicott the steam pump, and Blake Smith and Richard Jenkins have charge of the sinking of the new working shaft. The strong company which now holds a lease of the property will develop it. Louis Blanding has a most remarkable specimen from this mine, showing 9 metals and 4 minerals.

STRIKE.—Tuolumne Independent, Oct. 13: A rich strike has been made in the Platt mine, adjoining the Soulsby mine at Soulsbyville, fully up to the richest rock ever taken out of the famous Soulsby vein. This is at a depth of 200 feet. They are now putting in an engine and boiler, of 50-horse power, for pumping. A large double engine for hoisting is on the road and will soon be in place. Under the superintendency of Mr. Trittenbach, this mine will make a good record among the paying quartz veins of the county.

NEVADA.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—Virginia Enterprise, Oct. 13: The usual amount of good milling ore is being extracted from the slopes on the 1400 and 1435 levels. On the 1200 level are stoping from the parallel north drift, 60 feet north of the upraise above that drift. Continue to stop ore from the southeast drift run from that upraise, 58 feet above the track floor. Good ore is still being taken from the slopes on the 1600 and 1650 levels. The usual amount of ore has been shipped to the mills and the pulp assays will average about the same as last week.

GOULO & CURRY.—The bodies of ore developed on the 200 level and the raise above the fifth floor of the 400 level continue to look well. The exploring drifts are passing into material of a favorable appearance.

CONFIDENCE.—Repair work is about completed. All will be in good shape both underground and on the surface when the extraction of ore is resumed. The prospecting drifts have opened some good ground.

BEST & BELCHER.—The winze that is being sunk on the north drift from west crosscut No. 1, from the main northwest drift, is down about eight feet and shows from four to five feet of excellent milling ore.

CROWN POINT.—The 700 north drift advanced 30 feet during the past week and is now 94 feet south of the crosscut. The face is in porphyry and seams of clay. The Suto tunnel drift is out 71 feet.

BELCHER.—On the 200 level the north drift from the shaft is out 32 feet. It is in a promising formation of soft porphyry. The 850 station is being repaired and repairs are being made to chutes.

UNION CON. AND MEXICAN.—On the 1465 level a joint Union drift started from the east drift from the Ophir shaft at a point 150 feet in, has crossed the line and entered Mexican ground.

HALE & NORCROSS.—The southwest prospecting drift from the 15th floor above the 700 level has been extended 40 feet. The main west drift, 800 level, has been advanced 42 feet.

BALTIMORE.—Prospecting operations are still vigorously prosecuted on the 338 level in ground of a very promising character. A considerable amount of ore is being accumulated.

OPHIR.—On the 1465 level the south drift started from the end of the old east drift from the shaft station, 300 feet in, is extended 67 feet and is in soft porphyry.

SAVAGE.—From the 400 and 500 levels are extracting about 50 tons of ore per day, which is being shipped to the Rock Point mill.

OCCIDENTAL.—Extracted 112 tons of ore and shipped to the Atlanta mill 135 tons; average assay value of wagon samples, \$22.50.

CHOLLAR.—The face of the west drift on the 350 level is still in promising ground, consisting mainly of clay and porphyry.

POTOSI.—The face of the south drift on the 650 level is still in a mixture of vein material that gives low assays.

ALPHA AND EXCHEQUER.—On the 382 levels of these mines the usual prospecting drifts are being run.

SIERRA NEVADA.—No. 3 crosscut on the 520 level is out 580 feet. The face continues in porphyry.

SEG. BELCHER.—The only work being done is in the upraise. It is still in favorable ground.

ALTA.—Are still engaged in making repairs to the main shaft and to the hoisting works building.

YELLOW JACKET.—A good deal of repair work of various kinds is in progress.

SCORPION.—The usual progress is making in crosscut No. 1 on the 300 level.

LADY WASHINGTON.—The raise above the 725 level is making good progress.

UTAH.—On the 472 level in the north lateral drift, 73 feet north of east crosscut No. 1, east crosscut

No. 2 has been extended 50 feet; total length, 80 feet. The formation is porphyry, clay and quartz.

JUSTICE.—Work on the new mill is being rushed as rapidly as possible.

BULLION.—Work in the drifts on the 500 and 600 levels is continued.

KEYSTONE.—The sinking of the shaft is progressing favorably.

OVERMAN.—Are exploring below the tunnel level.

ANDES.—Are repairing the main shaft.

Lodi District.

SHIPPING ORE.—Belmont Courier, Oct. 13: Alfred Welch is shipping rich ore from Lodi to San Francisco for treatment.

Palmetto District.

BEING OPENED.—Hawthorne Bulletin, Oct. 10: The group of mines known as the Palmetto syndicate, situated at Palmetto, are being systematically opened up under the energetic management of Mr. R. B. Catherwood, who has lately assumed control of operations. These mines are owned by a syndicate of well-known wealthy New York capitalists. They have recently spent a large amount of money in improvements. A 12-ton mill and all the appliances for lixiviation process, by which the ore will be treated, are now in full working order, ready to start up at a moment's notice. Recent developments in the mines have been such as to create a ripple of excitement in local mining circles, the workings of ore giving astonishing returns in gold. General appearances indicate that as depth is attained gold values will predominate, the quartz being of an exceedingly lively character. Large boulders are found now and then in the working formation, and from one of them a working of some 28 ounces of rock gave a bullion return of \$40 in gold and \$120 in silver, a total value of \$32,000 in gold and \$1230 in silver to the ton. The property consists of 18 different mines, all more or less developed and all covered by U. S. patent.

Seligman District.

TUNNEL.—Tuscarora Times-Review, Oct. 12: A tunnel at Seligman has been started to tap the vein at a depth of 1000 feet. Eight-hour shifts and Burleigh drills are employed.

Tybo District.

DIMICK.—Belmont Courier, Oct. 13: The Dimick mine, Tybo, continues to yield rich ore.

ARIZONA.

ORE SHIPMENT.—Prescott Courier, Oct. 10: George Wickler will very soon make a large shipment from the White Spar mine. Aleck Thompson has finished moving a lot of machinery to the mountains. Riggs & Lawler, of the Hillside, are constantly shipping rich ore. Seven tons of ore from one of Bigelow & Smith's mines, sampled over \$90 to the ton. John Curtin has located the Ben Harrison mine in Hassayampa district. It is a very promising vein. Mr. Britton of the Boaz Co. says the mine is looking well; mill will start in about ten days.

AT BISBEE.—Democrat, Oct. 11: The hoisting works, together with all the machinery of the Czar mine, are being removed several feet back from their present location. In the meanwhile the ores from that property are hoisted through the shafts of the Queen and Holbrook. This necessitates an additional amount of work, but it will be remedied in a few days. Monday night the water pipe connected with the large smelter broke very suddenly, necessitating its being closed down for a few days, after which it will be in full blast again turning out its usual quota of bullion.

THE RATTLESNAKE.—Tombstone Epitaph, Oct. 8: Supt. Coffman states that three wagon-loads of machinery for the Rattlesnake mine are lying at Durkee's corral, and three more lying at Fairbanks. The reason for the delay is that on account of the massiveness of the machinery, new approaches to the mine will have to be made. The 400-foot level has been reached in the main shaft; a station is being cut out, and drifting to connect with the old shaft is in progress.

SILVER BASIN.—Clifton Clarion, Oct. 10: Frank Baxter was down from Silver Basin last week, purchasing supplies. Mr. Baxter reports the mines as still improving, and that another shipment will shortly be made.

GREENLEE.—Capt. J. Fletcher and Jas. Transue of New Mexico have purchased from A. S. Hickey at a good figure the splendid gold property in the Greenlee district known as the Silver Tip. The purchasers have for some time been examining prospects in the above district, and as both are old and experienced miners and millmen, the sale speaks well for the future outlook in that region.

MILL.—That Clifton will soon have a stamp-mill is now an assured fact. J. H. Hovey and B. F. Harrower returned from their trip to Globe last Saturday. Mr. Hovey informs us that he purchased during his absence a 5-stamp mill, and that the same is now on the road here. It will be erected on the Coon mine on Chase creek, upon which a force of men will be put at work immediately extracting ore.

GOLO GULCH.—Messrs. Paxton & Jenkins are reported to be taking out some fine ore from the Pittsburgh claim in Gold gulch, on which they have a lease from Messrs. Baxter & Whittington.

COLORADO.

MILL AND MINE.—Silverton Miner, Oct. 8: The Golden Chicken mill, in Turkey creek basin, has started up again on Gold King ore, also Crown Jewel. On the Sunnyside extension about a dozen men are employed, all taking out ore. The Turkey Creek Mining Co. have resumed work on their property in Turkey creek basin and will soon ship 100 tons to the Golden Chicken mill. The Adirondack, owned by J. H. Fessenden, has been leased to J. K. Machner. William Sullivan is working the Bandora, on the south fork of Mineral. The Tyrol will commence shipping and laying in winter supplies next week. Messrs. May and Levis shipped 11 tons of mineral from the Margie, above Chattanooga, this week which gave the excellent returns of 16 ozs. silver, one-tenth oz. gold and 66 per cent lead. Work on the Arctic in Cascade basin on Boulder mountain, has been suspended for the winter, and the owners, Messrs. Massey and Galvin, are greatly pleased with their season's work. Another claim on the celebrat-

ed Letter G vein on Kendall is coming to the front as a producer. This time it is the Pyramid lode, owned by Mrs. A. L. Cotton. The mill built for the Sunnyside mine has been run for some days with perfect success, and the Thompsons are elated at what will result in a profitable enterprise to them. The mill has ten stamps, weighing about 725 pounds with plates, and for concentrating the tailings there are two percussion tables such as are used about Central and Black Hawk, and with which Fisher's mill is also fitted. The work done by these tables is excellent. The mine has been systematically worked in preparation of supplying the mill to its largest capacity. The cost of milling will not exceed \$2 per ton, which will leave a very handsome margin of profit.

CHLORIDES.—Denver Review, Oct. 11: The latest excitement at Aspen is over a discovery made by James Casey, a well-known prospector, in the Silver Star mine. Some ten days ago the lessees were on the point of giving up their lease, and Mr. Casey was looking over the mine when he found indications of mineral. He then went to the lessees and tried to get an assignment of their lease. In the course of his negotiations with them he incautiously suggested that they let him have the lower end of the claim. On the 9th inst., the lessees concluded to give up their work and turn the claim over to Casey. They gathered up their tools and prepared to quit, but before going in town they concluded to look over the lower end of the claim. While there they stumbled on Casey's outcrop. Taking their tools down there, they went to work, and in a short while they had a showing that would make a miner's heart glad to look at. A mass of chlorides extended on every side wherever the soil was shoveled off. Some of the mineral was taken in Aspen and assayed 2000 ounces to the ton. Mr. Casey has been watching the bonanza he missed, and says they shoveled out \$4000 worth during the afternoon. It looks like a second Bonnybell, but is not yet sufficiently developed to justify any estimate of its value.

DAKOTA.

GALENA SMELTER.—Deadwood Pioneer, Oct. 10: Sheridan McBratney from Galena reports that the Queen Co. has already delivered 250 tons of ore to the smelter. Negotiations have closed and Mr. W. E. Terhune, formerly of the Iron Hill, has been employed to come out and assume charge of the plant. Mr. Terhune has already started from New York for the Hills and is due to arrive here now at any time. The fact that his services have been secured seems to assure the success of the undertaking, and all things now point to a profitable career for the gentlemen at the head of the enterprise. As has been more than once stated, Galena has a half dozen or more mines that can be operated to a good profit whenever a home market shall appear for the ores. Among them are the Queen, Horseshoe, Hayes, Bullion, Merritt and Cora. Developments on each are extensive and large ore bodies are disclosed. With the smelter in operation and a purchaser of ores at fair valuation, work on these mines will be on a larger scale than ever. Employment will be given a number of men and the camp must therefore prosper. The Castle Chief mine is looking splendidly, the ore body widening as it is followed. The 20-stamp mill is constantly pounding away, and it is anticipated that the October cleanup will be the largest yet made.

IDAHO.

KETCHUM SHIPMENTS.—Ketchum Keystone, Oct. 10: Shipments of ore and bullion from the Ketchum station during the past week aggregated 20 carloads, consisting of North Star, Sheep mountain, and Custer county ores, and Ramshorn and Clayton bullion. A gentleman named Clark discovered a fine silver-lead vein on Thompson creek, a branch of Warm Springs creek, a few days ago and got an assay of over 300 ounces from the croppings. Several lots of Sheep mountain ore have been sold to the First National bank in the past two weeks, and Kemp's pack-train is on the way in with another load. The cost of packing ore from the Sheep mountain country to Ketchum has recently been raised from \$35 to \$40, owing, presumably, to the lateness of the season and the danger of storms in the mountains. Milt Mounning sold the First National bank about three tons of ore from the Wood river claim last Tuesday, from which he received very good returns. His prospect is situated west of Boyle mountain, on Warm Springs creek. Mr. J. C. Fox of Custer county was interviewed by a representative of the Keystone yesterday relative to the newspaper report that he and others intended to put a smelting plant into the Sheep mountain country this fall. Mr. Fox says that this is not the case. They have contemplated the project of smelters for that district, but have done nothing thus far toward acting on the proposition, and will not do so before spring.

SIXTY-TON STACK FOR CLAYTON.—Challis Messenger, Oct. 10: A. J. Crook returned from Salt Lake several days ago. While gone, he ordered a 60-ton smelter for Clayton, and the machinery is now on the road. Work on the foundation and masonry has been commenced and they will be pushed to completion at an early day. As soon as the machinery arrives, it is to be placed in position, and the new smelter is expected to be in active operation before the beginning of the new year. Mr. Crook is also negotiating for the purchase of the Bellevue smelter, a 40-ton stack erected near that place some years ago, but which was never used. If this purchase is made, when all are placed in position, the Clayton smelters will have a capacity of 140 tons per day, and candid, sober-minded miners, who have examined their properties, say that the mines of the company on Ramshorn Hill and Kinickinnick and Slate creeks warrant them in putting up stacks of that capacity.

MONTANA.

BOULDER DISTRICT.—Mining Review, Oct. 8: In the above district, located in the vicinity of the famous Granite Mountain section, a good deal of prospecting is now going on with very encouraging results, and the possibilities for the district are indeed flattering. It will probably not be long now before some of these properties will be ranking among the paying mines of the Territory. Messrs. Connolly & Cole, who are working the Princeton

mine under a lease, are taking out and shipping some very fine ore. The Deer Lodge M. and Reduction Co. suspended work on their mine known as the Nonpareil, this action being taken because of lack of facilities for treating the ore, of which there is a large quantity of a smelting nature on the dump. The company is now contemplating the erection of a smelter on the ground. On the Traviola development work is being actively prosecuted, and a tunnel is being run to strike an ore body which it is expected will be encountered in the next 50 feet, the tunnel already having been run a distance of 200 feet. In a crosscut about 50 feet from the header of the tunnel, nearly four feet of good paying ore is reported in sight. A large quantity of ore is on the dump of the valuable property belonging to Messrs. Bradley and Sullivan, who intend to soon commence the shipment of ore, a wagon-road now being constructed for the purpose of hauling ore to the railroad station.

OLD CONFEDERATE GULCH.—This gulch was discovered in 1865, and lies east of the Missouri river, about 22 miles from Helena. From three of the bars or benches that lie above the bed of this gulch, about \$3,000,000 were taken out within some three years. From Montana bar, the Wheeler party, consisting of four men, took out, in a single season, \$600,000, or nearly half the aggregate product of the whole gulch. A single panful of dirt taken from the diggings contained \$1585 of dust. The Diamond Flume & Hydraulic Co. is now engaged in working over this same territory, with an equipment said to be as complete as any in Montana. Their ditches have a capacity of nearly 5000 inches of water, and a pressure of over 400 feet, and the chances are that this region will yet add considerably to the gold product of the Territory.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City Enterprise, Oct. 12: A recent shipment of eight tons of ore made by R. Johnson from the Old Man mine, netted \$319 per ton. This does not look as though the mine was worked out. Harry Hermann, the new superintendent of the Sheridan & Peacock Companies in the Mogollons, brought in a brick this week weighing 125 pounds. Besides the silver, it contains considerable gold, which will run the value of the brick up to about \$2500. Three-fourths of the ore for this brick came from the Sheridan mine, which several experts condemned as worthless. Mr. Hermann is satisfied that the mine will pay, and predicts that Cooney will yet be the biggest camp in the Territory. On Friday morning another brick arrived which weighed 87 pounds.

CLIFTON.—James Smith, who came in from Clifton last night, reports that affairs were pretty lively there for a time. Mr. Calhoun, who at one time had been assistant superintendent at the mines, was let out by Lawrence Russell. Mr. Calhoun went to Scotland and succeeded in having himself appointed as general superintendent vice Mr. Russell. He came out to Clifton with one of the directors with the authority to take charge. As soon as the men learned of the change, they all quit, including those employed on the road. After a day or two Mr. Russell was again put in charge, and everything is again moving on smoothly.

OREGON.

LA BELLEVUE.—Bedrock Democrat, Oct. 8: J. B. Cabell, owner of La Bellevue mine, at Granite district, reports the machinery for the Golden Gate concentrator, recently purchased by him in San Francisco, nearly ready for work and expects to begin reducing ore about the middle of the month. There are upward of 2000 tons of fine milling ore on the dump and hundreds of tons in sight in the mine. The mill is about one-half mile from the mine with good down-grade road connecting them. Thirty tons of ore daily are being delivered at the mill, and by the time the mill starts there will be sufficient ore on hand to keep it running constantly for an indefinite time. Great things are expected of the La Bellevue mine from the fact that it is one of the best developed mines in Oregon, having been worked constantly for the past 15 years. The ore veins are wide and the tunnels and shafts are so constructed as to afford an economical working. The La Bellevue is one of the permanent ore-producing mines of the Pacific Coast, and from the time the mill starts this month it will show up its merits in a manner that will prove conclusively that it is a dividend-paying mine.

UTAH.

REVIEW.—Salt Lake Tribune, Oct. 13: The receipts in this city for the week ending October 10th, inclusive, were to the value of \$120,123.18, of which \$79,563.67 was in bullion and \$40,559.51 was in ore. For the previous week the receipts were \$87,221.70 in ore and \$82,137.24 in bullion a total of \$169,358.94. The Ontario product for the week was of bullion, 12 961.50 fine ounces; from ore sales, \$24,508.45, an approximate total of \$37,469.95. The daily output for the week was 10,810.72 fine ounces of bullion; no ore sales. The Horn Silver has made no sign locally under the change of directorate. Fine bar receipts for the week were to the value of \$10,810.72. Base bullion received was valued at \$41,812.74. The Hanauer smelter produced during the week bullion valued at \$10,270; the Germania, \$16,670.21. Ore receipts in this city for the week were \$36,059.51 in value by Wells, Fargo & Co., and \$4500 by McCormick & Co.

BEAVER COUNTY.—Salt Lake Tribune, Oct. 10: W. S. Martin is up from Beaver county looking after a carload of ore just shipped. He is sending an average of one carload of ore per week to this city from his Talisman mine, a few miles from Milford. He reports a late strike of two feet of ore in the mine, which runs 119 ounces silver and 30 per cent lead. The upper workings of the mine had two veins 30 feet apart, but these seem to be concentrating into one, as they are getting close together in the lower workings, and there are good indications of the Talisman becoming one of the best properties in Star district.

MILFORD.—J. T. Kelly is up from Milford with six tons of ore from his Anvil mine. This property promises to soon become a regular shipper. It runs about 135 ounces silver and 30 per cent lead,

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING OCT. 9, 1888.

- 390,834.—LIFTING JACK—N. Beauregard, S. F.
- 390,772.—GRAIN SEPARATOR—W. L. Gilson, McMinnville, Ogn.
- 390,959.—FRUIT-DRIER—Wm. Grey, San Jose, Cal.
- 390,784.—PUZZLE AND ADVERTISING DEVICE—J. F. Jones, Eishore, Cal.
- 390,866.—BOILER-CLEANER—Lane & Davies, Calico, Cal.
- 390,867.—DUMP-CAR—L. J. Lewis, S. F.
- 390,788.—ADDING MACHINE—C. B. F. Lincoln, S. F.
- 390,878.—SASH-HOLDER—Wm. Mathews, Alameda, Cal.
- 390,882.—CABLE GRIP—R. A. McLellan, S. F.
- 390,703.—HEAD AND BACK FOR LOUNGES—A. G. Phillips, S. F.
- 390,916.—BICYCLE—W. F. Stevens, S. F.
- 390,994.—INK-FOUNTAIN FOR PRINTING PRESSES—H. Swan, S. F.
- 390,920.—HOSE BRIDGE—Tucker & Keegan, S. F.
- 390,929.—MOTOR—G. F. Wells, S. F.
- 390,732.—FIRE-PROOF BUILDINGS—E. J. Weston, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BICYCLE.—William F. Stevens, S. F. No. 390,916. Dated Oct. 9, 1888. The improvement in this machine consist in the peculiar frame, a novel arrangement of springs by which the frame is suspended and connected with the wheels, a novel driving mechanism and minor features of construction.

FRUIT DRIER.—William Grey, San Jose, Cal. No. 390,959. Dated Oct. 9, 1888. This drier belongs to that class of fruit-driers in which the baskets or fruit receptacles are suspended from a wheel which rotates within a heated shell. The improvement in this drier consist in the novel arrangement of fire-chamber and connected flues, and the air pipes passing through the shell.

DUMP-CAR.—Levi Jacob Lewie, S. F. No. 390,867. Dated Oct. 9, 1888. In this car the load is discharged by opening the bottom. The car is made with a bottom having one or more sections, and has a drag-ropes tongue connected with it. Springs and holding arms or trips, and a means for automatically opening the trips are employed so as to relieve the bottom and let it drop to discharge the load.

SASH HOLDER.—William Mathews, Alameda, Cal. No. 390,878. Dated Oct. 9, 1888. This holder looks the window in position, either opened or closed. It consists of a double inclined piece pivoted within a casing on the top of the lower sash. A cylinder or roller lies within the face of the double inclined piece, and is caused to press against the upper sash by means of a screw which sets up the piece. The locking effect of the roller does not depend upon the pressure of the screw, but upon the hindering action of the roller between the sash and the inclined piece.

ORCHARD AND VINEYARD CULTIVATOR.—John Morgan, Santa Clara, Cal. No. 390,305. Dated Oct. 2, 1888. This implement, as its name implies, is for use in orchards and vineyards. It has a novel frame made of har iron. To the sides of the frame are adjutably connected hars which carry supplementary teeth. These may be taken off or put on at pleasure to vary the width of the machine. The pole or tongue is adjutably connected to suit different sizes of horses, and the wheels and connections are adjustable to keep the draft low. The peculiar shape of the frame provides for the proper location of the several teeth, so that all the ground will be properly passed over.

DEVICE FOR CATCHING STOCK.—Francis Marian Anahle, Rocklin, Cal. No. 390,331. Dated Oct. 2, 1888. This invention belongs to that class of devices for catching animals from a distance, in which pivoted jaws, adapted to grip the leg of the animal, are extended upon a long pole and are operated by means of a cord. In this implement one of the jaws is provided on its shank or stem with ratchet teeth, and the other jaw has connected with its end a link which embraces the shank or stem of the first jaw and engages its teeth, the link being operated by a cord attached to its free end. The advantage of this device are that it can be readily used, and that when once applied it holds, no matter whether the animal moves from or toward the operator.

CABLE GRIP.—Robert A. McLellan, S. F. No. 390,882. Dated Oct. 9, 1888. This grip is of the class commonly known as "center" or

"bottom" grips. The general object of this improved grip is to simplify the construction and reduce the cost of manufacture and repairs. Particular objects are to avoid lost motion in the ewing of the jaws, to reduce the number of joints and thereby have less liability to looseness and rattling, to avoid the use of an independent device for compensating for the wear of the dies, and to so connect the operating lever that its power of leverage may be the same in any position. The improvement consists in a novel hinge connection for the jaws and in a novel connection for the lever foot.

SPRAY NOZZLE.—Lester D. Greene and John Crofton, Walnut Grove, and Geo. B. Greene, Cortland, Cal., said Lester D. Greene and John Crofton assignors to said Geo. B. Greene. No. 390,474. Dated Oct. 2, 1888. This nozzle is a tip for forming and ejecting a spray, and is for use in the treatment of fruit trees, vines and shrubs. The object attained by this device is the formation and discharge of the spray in the most serviceable shape and from the most convenient point; also the thorough and easy clearing out of the ports when they become obstructed. It is composed of a hollow-shaped shell having a spray port in front, and one on one side, and a discharge hole on the other side, and a rotary plug, fitted to the shell, and having a port of large diameter, communicating at right angles with a port of small diameter. In the larger port, which is the outlet port, the liquid fed to it through the smaller port and confined by the small spray port of the shell, acquires a kind of spiral or rotary motion and is ejected in the shape of a broad cone or funnel, instead of in a flat fan shape, as is usual, and the angular location of the larger port with respect to the smaller port insures this spiral or rotary motion.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco.

LIVERMORE VALLEY R. R. Co., Oct. 15. Object, to construct a road from the town of Livermore to the Livermore coal mines. The capital stock is \$1,000,000. Directors—J. N. Knowles, Israel Lawton, I. W. Taher, E. Dunham, D. Guttman, G. W. Comegys and B. Noyes.

PACIFIC PACKING Co., Oct. 15. Capital stock, \$100,000. Directors—Lionel Sloes, Chas. Hirsch, Louis Sloes, Jr., Ben Arnold and G. Niehaum.

ROYAL PACKING Co., Oct. 15. Capital stock, \$100,000. Directors—Lionel Sloes, C. Hirsch, Louis Sloes, Jr., Ben Arnold and G. Niehaum.

AMERICAN PATENT GAS RANGE AND LIQUID FUEL Co., Oct. 16: Object, to manufacture and deal in gas and gasoline ranges, stoves, etc., constructed upon the principles of the Whorff patent. Capital stock, \$500,000, in 100,000 shares. Directors—F. A. Huntington, J. N. E. Wilson, W. E. Mighell, Franklin P. Bull and W. H. Davis.

PACIFIC EDISON PHONOGRAPH Co., Oct. 17. Capital stock, \$300,000. Object, to continue the commercial and manufacturing business of H. P. Gregory & Co. in California, Oregon, Australia, etc., as dealers in iron and wood-working machinery, etc. Directors—Elise McClure Gregory, Tyler Henshaw, Chas. P. Belle of Oakland, Henry Shaw Smith of Sydney, Australia, and Sidney S. Palmer of Portland, Or.

SMYRNA COLONY ASSOCIATION. Oct. 17. Capital stock, \$90,000. Directors—Geo. H. Foster, W. B. Wilsbire, Geo. A. Raymond, C. O. Carpenter and E. Brown.

Mining Share Market.

For the first time in some months there has been, during the past week, some activity in the mining share market. Business has been very lively and many shares have changed hands at comparatively good prices. News received from Beet and Bolshoer state that it will take a few days more to complete the etation at the head of the winz, and when it is finished they will sink on the new development. The Mexican mill is expected to start up on Norcross ore at an early date, and at the Nevada mill a long string of new blanket sluices has been put in preparatory to the resumption of ore reduction. The mill will start up with 20 additional stamps. The Virginia Enterprise says: A valuable development at this time—just when the water-supply in the Cereon river is rapidly increasing and the mills are beginning to start up—would cause quite a boom in the Comstock shares.

Good progress is being made in the work of setting up the electric apparatus by means of which the power of the Pelton wheels on the Sutro tunnel level of the Chollar mine will be transmitted to the Nevada mill.

Bullion Shipments.

We quote shipments since our last, and shall hereafter to receive further reports:

Eureka Con., Oct. 16, \$20,000; Sheridan (N. M.), 12, \$2500; Young America (Sierra Co.), for September, \$25,000; Howard (A. T.), 12, \$6834; Cons. California and Virginia, 16, \$60,000; Hananer, 13, \$3350; Germania, 13, \$3462; Hananer, 13, \$1660; Germania, 11, \$4020; Hananer, 11, \$1670; Mt. Diablo, \$7313.

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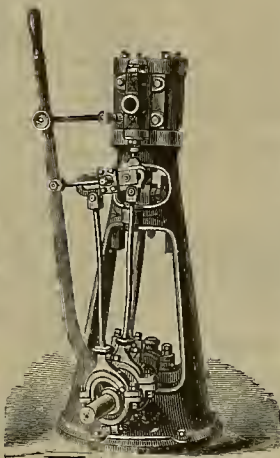
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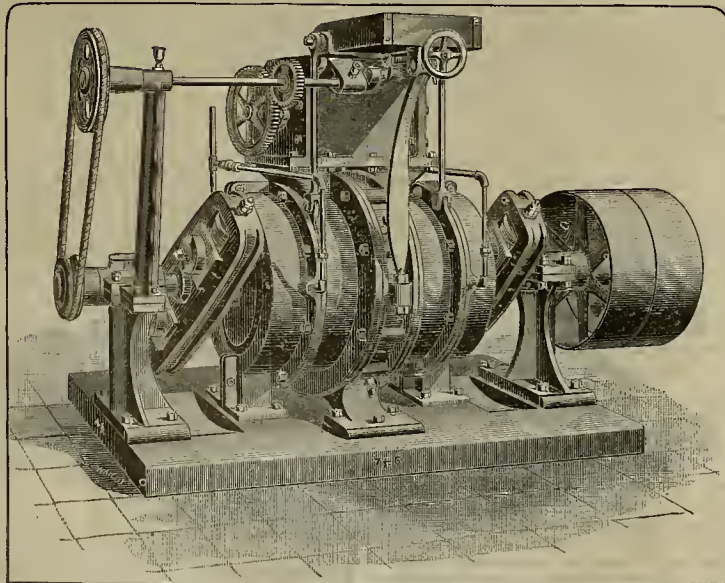
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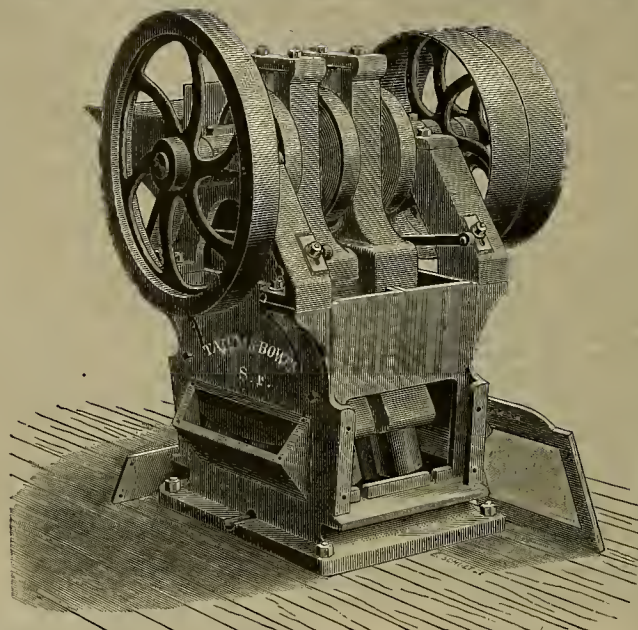
And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

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The Mortar has screens at both ends, giving ample discharge. There are no cams or tappets to wear or be adjusted. The stamps adjust themselves as the shoes wear.

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Goes with each Mill. We also have a suitable

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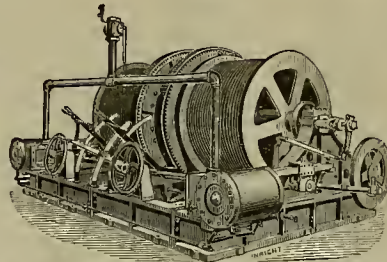
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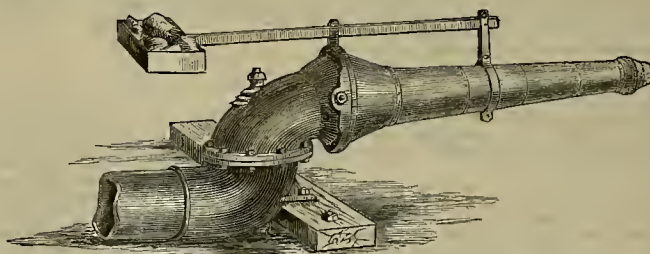
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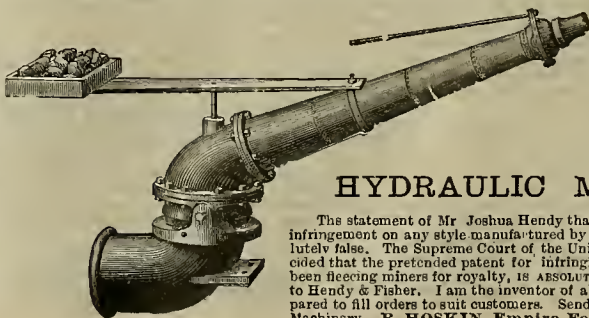
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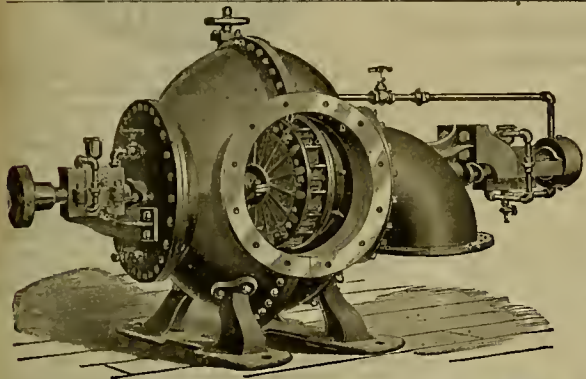
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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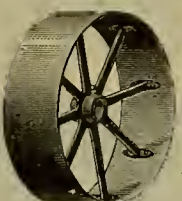
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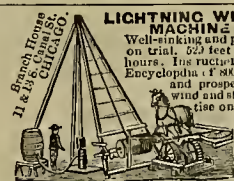
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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Oct. 18, 1888.

SILVER—The market abroad fluctuated slightly the past week, closing firm at 93½c in New York. Our market has shown a fair degree of activity, but, as a rule, buyers' views are said to be considerably below the parity of the London market. Several sales are reported to have been made for China and India at 93¼ to 93½c. In last month there was imported into this port silver as follows: Foreign coin, \$63,904; American coin, \$75; foreign bullion, \$262,359. It is claimed by those in position to know that there will be a large increase in the silver output of the mines on this coast, principally from those in Nevada. It is asserted with great confidence that the output of bullion of the Comstock mines in Nevada, alone, will average fully, if not over, \$2,500,000 this winter, but what the percentage will be in silver it is difficult to say. Many are inclined to the opinion that the ore developments on the Red lode (west of the Bonanza lode) contain a larger percentage of gold than did the latter lode.

The following table shows the amount of silver bullion in the principal European banks Sept. 27th, and at the corresponding date last year:

Banks of	1888.	1887.
France.....	£49,234,560	£47,783,398
Germany.....	15,846,568	14,868,000
Austria-Hungary.....	15,337,000	14,479,000
Netherlands.....	7,719,000	6,170,000
Nat. Belgium.....	1,215,000	1,216,000
Nat. Italy.....	1,115,000	1,118,000
Totals.....	£90,129,226	£87,664,398
Totals, previous week.....	89,199,560	88,469,790

QUICKSILVER—The market has ruled easy throughout the week. As usual, with a degree of weakness in the market, buyers act cautiously, and are only tempted to take freely by concessions from sellers. The distant mining districts, away from railroad communication, are buying winter supplies, but other mining centers buy lightly. The export demand is fair.

The local market closed very strong to-day at \$45 to \$47.50, in sympathy with a cable from Europe, reporting higher prices.

IRON—Importers claim that so far this year the consumption on this coast, particularly in this city, is largely in excess of the like time last year. The stock here is small, having gone into consumption. The production of the mines on Puget Sound is contracted to a new rolling-mill that is being erected there. The iron market abroad and at the East is reported to be very strong.

LEAD—The market is strong at full prices. The output of the coast, at present, is not up to what is looked for in the near future. Shot is very strong at the late advances. It is claimed that the shot manufacturers here and at the East have entered into an agreement to maintain prices on a higher level so as to net a profit—heretofore they barely met current expenses.

CHROME IRON ORE—The output of this State is about 5000 tons a year, which is marketed at the East, owing to the high price of coal in this city. There is hardly a county in this State where it is not found. At present the chief source of supply is in San Luis Obispo county and Placer county.

TIN—Spot continues dull and easy. To arrive is also heavy, but for prompt shipment there is a good demand for plate from salmon and fruit canners for next year's business. Prices were advanced to \$5.15 for prompt shipment, but at the close it is said that this can be shaded by larger buyers.

COPPER—There is very little of special interest to note. The demand is fair, with prices well maintained.

COAL—Importers continue to report a strong market. They claim that a higher range of values is not at all unlikely in the near future. Several large consumers claim that families, hotels, etc., are better stocked than at this time in 1887. They bought under the impression that there would be a coal famine. The consumption will depend largely upon the character of the winter—whether very cold or moderately cold. The yards in the Southern part of the State are like the yards here, full.

BORAX—The market is quiet, but steady at quotations.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Oct. 18, 1888.—The following are the closing prices the past week:

	Silver.	Copper.	Lead.	Tin.
Thursday.....	93½	\$17.45	\$1.90	\$23.50
Friday.....	93½	17.45	1.90	22.20
Saturday.....	93½	17.45	1.90	23.00
Sunday.....	93½	17.40	1.90	22.90
Tuesday.....	93½	17.45	1.90	23.00
Wednesday.....	93½	17.45	1.90	23.25

The market closes as follows: Quicksilver is steady at from 60¢ to 63¢.

Borax is in fair demand from the manufacturers at fully the last figures.

Lake Ingot copper is dull. It is offered at 17½c for early 1889 delivery. The next three months' options may be quoted at about 17½c. The syndicate supplies consumers at about 16½c to 16¾c. Outside sellers offer small lots in casks at 17 to 17½c. Casting brands are slow in sale, but firm at 16c.

Pig lead is speculatively quoted for November at \$4 92½ to \$4 95. Closing weak.

Tin is very firm at an advance.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

TIN—Cable quotations declined until yesterday, when the foreign market closed firmer; and we have followed the cue given from London and improved on it; futures losing 60 points in the first four days; and recovering 35 yesterday, from which 5 points were lost again to-day. Spot has ruled proportionately more steady, as a result of small stocks. Sales have run up to a total of 135 tons, and a more spirited tone has pervaded the trading. To-day was quiet and steady.

COPPER—Remains hopelessly stagnant, only 75,000 pounds changing hands on the floor; but

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALE.	SECRETARY.	PLACE OF BUSINESS.
American Eagle M Co.....	California.....	1.....	10, Sept 20, Oct 25.....	Nov 15, J M Reynolds.....	503 California St
Alta S M Co.....	Nevada.....	38.....	50, Sept 28, Nov 5.....	Nov 26, L Osborn.....	309 Montgomery St
Andes S M Co.....	Nevada.....	34.....	25, Oct 5, Nov 12.....	Dec 3, B Harris.....	309 Montgomery St
Baltimor S M Co.....	Nevada.....	3.....	25, Sept 22, Oct 25.....	Nov 13, A R Grim.....	402 Montgomery St
Belcher M Co.....	Nevada.....	36.....	50, Sept 18, Oct 23.....	Nov 12, J Crockett.....	327 Pine St
Bodie Con M Co.....	California.....	3.....	50, Sept 24, Oct 29.....	Nov 30, J W Sessions.....	329 Montgomery St
Best & Belcher M Co.....	Nevada.....	41.....	50, Oct 16, Nov 21.....	Dec 11, L Osborn.....	309 Montgomery St
Chloride M Co.....	Nevada.....	1.....	50, Oct 1, Oct 15.....	Nov 5, G E Kratzenjey.....	328 Montgomery St
Crown Point & S M Co.....	Nevada.....	50.....	50, Oct 2, Nov 5.....	Nov 28, J Newlands.....	329 Pine St
Cholla M Co.....	Nevada.....	26.....	50, Oct 8, Nov 13.....	Dec 5, C E Elliot.....	309 Montgomery St
Con Imperial M Co.....	Nevada.....	25.....	50, Oct 15, Nov 21.....	Dec 12, C L McCoy.....	329 Pine St
De Monte Co.....	Nevada.....	1.....	25, Oct 15, Nov 20.....	Dec 12, J A Few.....	319 Pine St
Empire M Co.....	California.....	1.....	25, Sept 8, Oct 12.....	Nov 8, F L.....	319 Pine St
Eschbacher M Co.....	Nevada.....	25.....	21, Sept 8, Oct 10.....	Oct 31, C E Elliot.....	309 Montgomery St
Gould & Curry S M Co.....	Nevada.....	50.....	30, Oct 2, Nov 9.....	Nov 30, A K Durrow.....	309 Montgomery St
Gray Eagle M Co.....	California.....	9.....	50, Sept 4, Oct 10.....	Oct 30, O H Bogart.....	327 Pine St
Gray Eagle S M Co.....	California.....	2.....	15, Sept 18, Oct 22.....	Nov 12, A Halsey.....	325 Montgomery St
Grand Prize M Co.....	Nevada.....	19.....	25, Oct 13, Nov 17.....	Dec 5, R M Gray.....	327 Pine St
Horseshoe Bar Con M Co.....	California.....	1.....	25, Oct 9, Nov 17.....	Dec 10, D M Keat.....	330 Pine St
Justice M Co.....	Nevada.....	47.....	25, Sept 25, Oct 31.....	Nov 19, R E Kelly.....	419 California St
Live Oak D It M Co.....	California.....	10.....	65, Aug 20, Sept 27.....	Oct 19, J M Osborn.....	328 Montgomery St
Lord of Lora & S M Co.....	Nevada.....	5.....	10, Sept 8, Oct 12.....	Nov 2, E N Van Brunt.....	3 Pine St
Mayflower Gravel M Co.....	California.....	43.....	50, Oct 18, Nov 23.....	Dec 10, J Morizo.....	328 Montgomery St
Mono M Co.....	California.....	25.....	50, Sept 20, Oct 25.....	Nov 28, G W Sessions.....	329 Montgomery St
Montrose M Co.....	Colorado.....	1.....	14, Oct 3, Nov 12.....	Dec 15, F E Luty.....	330 Pine St
North Con nonwealth M Co.....	Nevada.....	1.....	30, Oct 15, Nov 20.....	Dec 11, J J Pine.....	330 Pine St
Ophir M Co.....	Nevada.....	54.....	50, Sept 1, Oct 4.....	Oct 22, E B Holmes.....	309 Montgomery St
Potosi M Co.....	Nevada.....	31.....	50, Oct 1, Nov 6.....	Nov 27, C E Elliot.....	309 Montgomery St
Savage M Co.....	Nevada.....	71.....	50, Oct 4, Nov 7.....	Nov 27, E B Holmes.....	309 Montgomery St
Tuscarora Con M Co.....	Nevada.....	1.....	65, Oct 1, Nov 14.....	Dec 3, J J Scoville.....	309 Montgomery St
Tuscarora G M & M Co.....	California.....	1.....	62, Sept 8, Oct 10.....	Nov 3, W J Gurcutt.....	328 Pine St
Utah Con M Co.....	Nevada.....	5.....	35, Oct 4, Nov 8.....	Nov 26, A H Fish.....	309 Montgomery St
Virginia Creek Hyd M Co.....	California.....	6.....	66, Aug 29, Oct 9.....	Oct 29, J M Quay.....	408 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alpha Con M Co.....	Nevada.....	C E Elliot.....	309 Montgomery St.....	Annual.....	Oct 30
Confidence Con M Co.....	Arizona.....	D C Bates.....	309 Montgomery St.....	Annual.....	Oct 22
Confidence S M Co.....	Nevada.....	A S Genth.....	309 Montgomery St.....	Annual.....	Oct 22
Kosuth M Co.....	Nevada.....	C K Sturtevant.....	309 Montgomery St.....	Annual.....	Oct 22
Mayflower G M Co.....	California.....	J Morizo.....	309 Montgomery St.....	Annual.....	Oct 29
Occidental Con M Co.....	Nevada.....	A K Durrow.....	309 Montgomery St.....	Annual.....	Nov 5
Potosi M Co.....	Nevada.....	J Stadfeldt Jr.....	309 Montgomery St.....	Annual.....	Oct 25

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT	PAYABLE
Con California & Va M Co.....	Nevada.....	A W Havens.....	309 Montgomery St.....	50.....	Oct 11
Confidence S M Co.....	Nevada.....	A S Genth.....	309 Montgomery St.....	1.00.....	Aug 6
Confidence Con M Co.....	Nevada.....	H P Hotton.....	309 Montgomery St.....	25.....	Aug 9
Mt Diablo M & M Co.....	Nevada.....	R W Heath.....	313 Pine St.....	25.....	Aug 27
North Star M Co.....	California.....	D A Jennings.....	401 California St.....	50.....	July 11
Hale & Norcross S M Co.....	Nevada.....	J F Lightner.....	309 Montgomery St.....	50.....	Aug 8
Idaho M Co.....	California.....	.....	Grass Valley.....	50.....	Oct 10
Pacific Iron & Steel Co.....	California.....	.....	325 Montgomery St.....	1.00.....	July 10
Standard Con M Co.....	California.....	J W Pew.....	310 Pine St.....	05.....	June 12

values have to a slight degree softened during the week.

LEAD—On a decline in prices of 30 points, transactions ran up to 1350 tons, and 250 tons more have been done on the quick recovery made of 20 points from the lowest figures reached. Closes firm but quiet.

SPELTER—Opened firm but dull on Monday, holding barely steady for several days, and weakening 5 or 10 points toward the close; but did not become active at any time.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Biliton Tin, @—; Banca Tin, @—; Baltimore Copper, \$15.80@—; Orford Copper, \$16.00@ 16.25; P. S. C. Copper, @—; Foreign Lead, \$5.00@5.25; Foreign Spelter, \$5.40@5.50; Antimony, \$9.75@13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Oct. 18, 1888.	THURSDAY, Oct. 18, 1888.
ANTIMONY—French Star.....	13 @ 14
BORAX—Refined.....	71 @ 74
Powdered.....	71 @ 74
Concentrated.....	61 @ 71
COPPER.....	
Bolt.....	26 @ 27
Sheathing.....	26 @ 27
Ingot.....	50 @ 51.00
Pure Box Sheet.....	50 @ 51
IRON—Glenbrook ton.....	@ 28.50
Eglinton ton.....	@ 27.00
American Soft, No. 1, ton.....	@ 31.00
Oregon Pig, 20 lb.....	21 @ 22.00
Clay Lane White.....	@ 23.00
Shotta, No. 1.....	@ 23.00
Bar Iron (base price) @ ton.....	21 @ 3
Chrome iron ore, @ ton.....	8 @ 10.00
LEAD.....	
Refined.....	51 @ 52
Sheet.....	8 @ 9
Pipe.....	7 @ 8
Shot, discount 10% on 500 bags Drop, @ bag.....	1 @ 5
Back, @ bag.....	1 @ 5
Chilled, do.....	2 @ 5
STEEL—English, lb.....	16 @ 20
Canton tool.....	9 @ 10
Black Diamond tool.....	9 @ 10
Pick and Hammer.....	8 @ 10
Machinery.....	4 @ 5
Toe Calk.....	4 @ 5
TINPLATE—Coke.....	5 @ 5.15
Charcoal, 14x20.....	75 @ 7.25
do roofing, 14x20.....	5 @ 5.62
Pig tin, @ lb.....	23 @ 24
QUICKSILVER—By the flask.....	45 @ 47.50
Flasks, new.....	1 @ 5
Flasks, old.....	85 @ 90

PRICES OF COAL "TO ARRIVE."

Per Ton.	Per Ton.
Australian.....\$11.50	@ 12.00 Cardiff.....11 @ 11.50
Liverpool Stm 12 00	@ 12.00 Lehigh Lump.....10 @ 11.50
West Hartley, 12 00	@ 13.00 Cumberland bk12 50 @ 13.00
Scotch Splint, 12 00	@ 13.00 Egg, hard.....13 @ 14.00

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Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer county, California. NOTICE—There are delinquent upon the following described stock, on account of Assessment (No. 1) levied on the 4th day of September, 1888, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	Shares.	Amount.
D. Bowers.....	73	600	\$26.00
Wm. Mc Coy.....	329	40	2.00
Theo. Wetzel, Trustee.....	364	8	.40

And in accordance with law, and an order of the Board of Directors, made on the fourth day of September, 1888, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, room 9, No. 327 Pine street, San Francisco, Cal., on Tuesday, the thirtieth (30) day of October, 1888, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

O. H. BOGART, Secretary.

OFFICE—Room 9, No. 327 Pine St., San Francisco, Cal.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Sept. 27.	WEEK ENDING Oct. 6.	WEEK ENDING Oct. 11.	WEEK ENDING Oct. 18.
Alpha.....	2.05	2.50	2.35	2.85
Alta.....	1.60	2.00	1.30	1.70
Andes.....	1.85	1.00	1.00	1.05
Argenta.....	4.00	4.50	4.25	5.10
Belcher.....	3.30	3.65	3.35	4.00
Best & Belcher.....	1.50	1.25	1.35	1.50
Bullion.....	25	25	25	25
Baltimore.....	25	25	25	25
Bodie Isle.....	40	45	40	40
Bodie Con.....	1.10	1.30	1.15	1.25
Benton.....	1.15	1.30	1.15	1.25
Bodie Tunnel.....	3.00	3.50	3.50	4.00
Bulwer.....	90	95	85	95
Con. Va. & Cal.....	3.00	3.50	3.50	4.00
Challenge.....	3.85	4.25	4.00	5.00
Chloride.....	2.55	2.75	2.60	3.00
Chomalar.....	11	12	12	13
Confidence.....	40	45	45	45
Con. Imperial.....	35	35	40	40
Caladenia.....	35	35	40	40
Con. Pacific.....	6.75	4.15	1.15	4.90
Crown Point.....	75	85	75	80
Orocrack.....	30	30	30	35
Central.....	30	30	30	35
Dudley.....	30	30	30	35
East & B.....	3.50	3.50	3.50	3.50
Eureka Con.....	3.50	3.50	3.50	3.50
Eschbacher.....	35	1.00	1.25	1.60
Grand Prize.....	55	60	50	45
Gould & Curry.....	2.50	2.75	2.60	3.00
Hale & Norcross.....	4.25	4.00	4.50	5.25
Holmes.....	15	40	30	35
Independence.....	30	30	30	35
Iowa.....	1.00	1.10	1.00	1.05
Justus.....	2.50	3.00	3.02	3.13
Kentuck.....	15	45	50	50
Lady Wash.....	55	75	80	85
Martin White.....	3.25	3.45	3.00	3.80
Mono.....	2.40	2.10	2.10	2.60
Mt. Diablo.....	1.50	1.60	1.75	2.25
Northern Belle.....	2.65	2.75	2.50	2.75
Navajo.....	3.00	4.00	3.25	3.80
North Belle Isle.....	1.30	1.40	1.35	1.40
Occidental.....	5.30	6.50	7.00	8.50
Ophir.....	40	45	45	45
Potosi.....	2.60	2.92	3.02	3.52
Peerless.....	1.60	1.65	1.70	1.80
Pet.....	45	45	45	45
Pt. Sheridan.....	2.70	2.90	2.45	2.95
Silver Star.....	2.83	3.02	3.45	3.40
Savage.....	3.00	3.15	3.10	3.50
S. B. & M.....	50	50	50	55
Sierra Nevada.....	50	55	65	65
Silver Hill.....	50	55	65	65
Silver King.....	50	55	65	65
Scorpion.....	50	55	65	65
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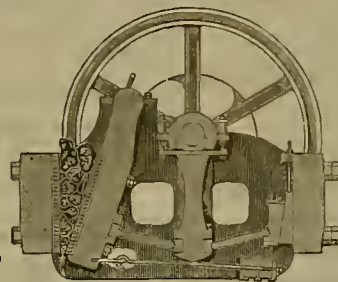
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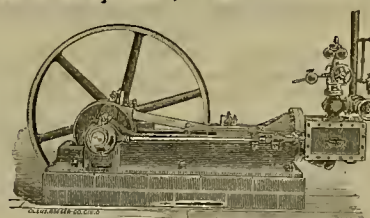


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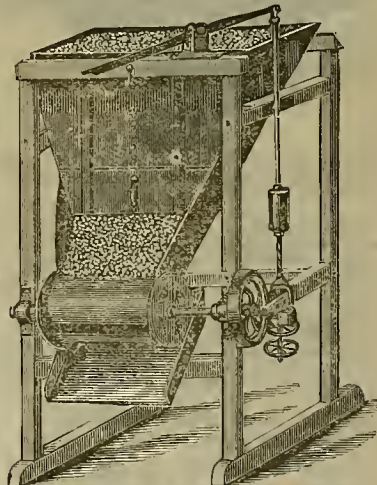
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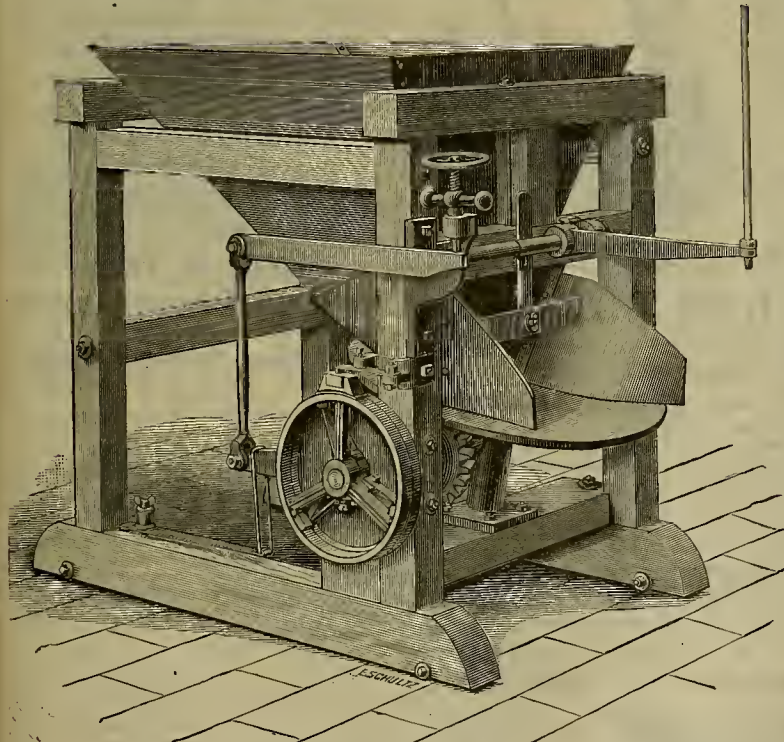
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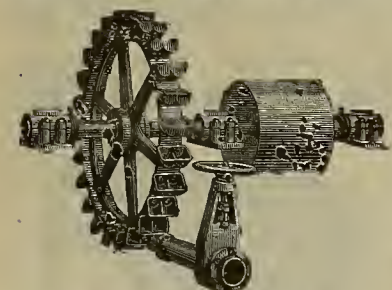
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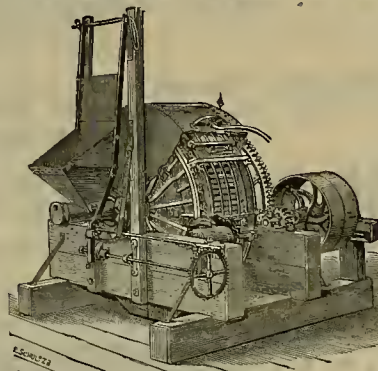
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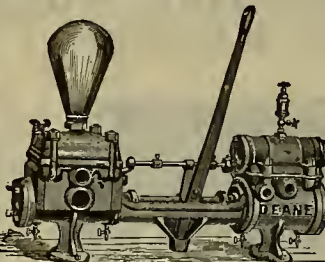
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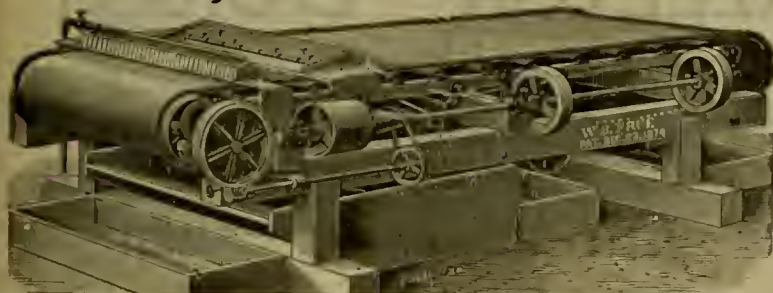
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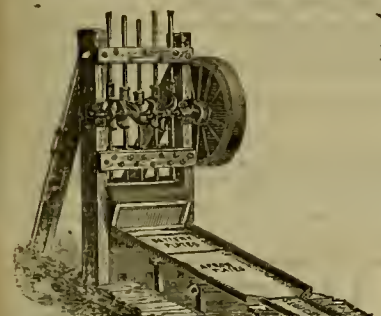
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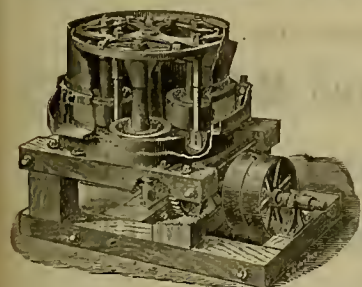


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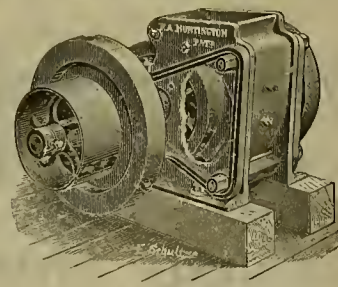


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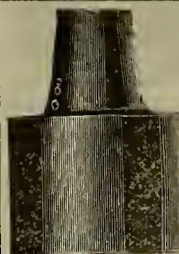
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Is acknowledged by the most eminent Engineers in the country to be the greatest improvement that has ever been made in a Steam Generator.

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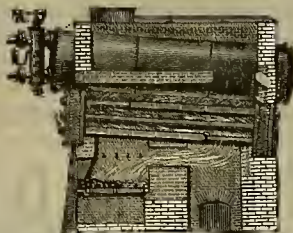
L. R. MEAD, Secretary.

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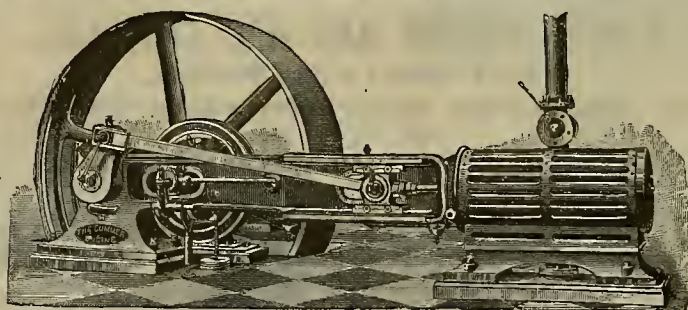
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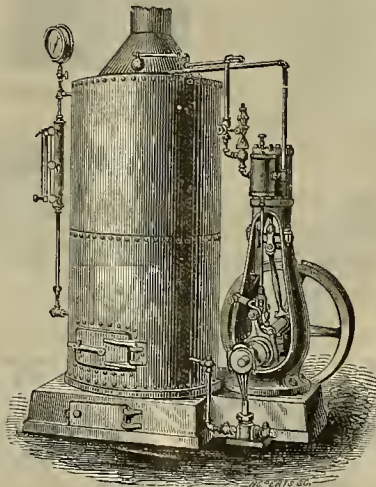
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Bogge & Clarke" Centrifugal Pumps.

The Volker & Felthousen M'fg Co.'s

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, OCTOBER 27, 1888.

VOLUME LVI.
Number 17.

An Improved Small Stamp-Mill.

About a year since we gave a description and illustration of the Double Economic Stamp-mill. In this the high drop of the old stamp is more than compensated by the great weight (1200 pounds each) and the rapidity (300 strokes a minute) with which the stamps in this mill run. There are four shoes on each stamp, so that there are 4800 strokes of the shoes on the dies per minute. The mortar has double discharge and the stamps adjust themselves as the shoes wear.

After considerable experience with this appliance, the manufacturers, Messrs. Tatum & Bowen, 34 and 36 Fremont street, this city, have finally perfected this mill, and an engraving of the improved mill is here given. The principal improvement consists in oscillating the stamps by means of sleeves with universal joint. This allows the stamp the utmost freedom of movement, without any tendency to bind or cramp in the working parts. An automatic ore-feeder goes with each mill, and is seen attached in the engraving. This appliance is designed for the use of miners who do not wish to go to the expense of the large stamp-mill of the ordinary type. It will also answer the requirements of large mines. Numbers of these machines are now in use and others have been ordered. The added improvements greatly increase the usefulness of the mill.

THE DEBRIS CONTROVERSY.—In the Supreme Court this week the George H. Sternes and William H. Lee habeas corpus cases were argued and submitted to be filed on briefs, to be submitted by the petitioner in 15 days and by the people in 10 days thereafter. The petitioner Sternes is a Deputy Sheriff of Yuba county, who arrested certain Chinamen, on warrants issued to him by one of the courts of that county, for violating the law with regard to hydraulic mining, and Lee was a citizen whom Sternes, as Deputy Sheriff, summoned as a part of the posse comitatus to assist him. They were afterward themselves arrested at the instance of the Chinamen and their legal adviser, on a charge of kidnaping, and were committed to jail by a justice of the peace of Nevada Township, Nevada county.

OREGON IRON.—On the 18th inst. the fire was lighted in the new furnace of the Oregon Iron & Steel Co. at Oswego, five miles from Portland. Work was also begun in the company's iron-pipe foundry, and the first joint of the 2000 tons contracted for by this city was

successfully cast. The furnace and works are of the most modern style, and are not surpassed by any in the country. The mine is putting out 15 tons of ore per day. The company contemplates the erection of additional furnaces in the near future, and the construc-

tion of works for making bar iron, and eventually to manufacture steel rails.

The asbestos found near Elsinore, San Diego county, is to be worked up in a factory which is to be built at that town.

Sulphuric Acid Manufacture.

In Mr. Adams' paper, which was mentioned last week, he traces the gradual progress of the manufacture of sulphuric acid for the past 20 years, recording the important changes and submitting only the marked types of apparatus which have come under his notice. It is not necessary to cite the differences in chamber construction, such changes, if any, having been made in the direction of increased length and width, and the coupling together of three or more chambers to form a system, the more perfectly to utilize auxiliary towers. A new era has, however, been inaugurated in the general working of complete acid plants by the introduction, during the period named, of the Gay-Lussac absorbing columns, and the Glover tower, inasmuch as the chemical knowledge to properly adjust and harmonize these adjuncts has brought about savings and improvements in all departments. Nevertheless, only about one-half of our American works have adopted the towers.

Figs. 1 and 2 show a type of furnace used throughout the world in 1867-8, being modified to suit local circumstances or individual ideas. The type illustrates in one of many forms of furnaces only the means of shielding the retorts from the direct blast of heat in coal firing, the methods employed to carry off hot acids

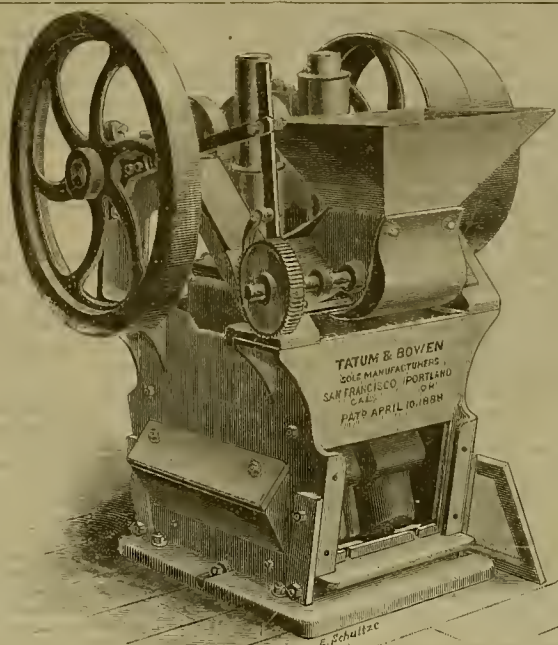
when glasses break, the position of the leaden pipe which receives the vapors resulting from boiling pan acids, etc. Fig. 3 is a modification of the others, also in use largely at the time mentioned. An iron pot is built into and made a part of the furnace proper, holding the glass retort on a sand bed intact from fire or draught. At the lowest part of this pot a small cast-iron pipe (not shown) extended through the furnace walls and carried off any waste acid from broken glasses into reservoirs of stone or lead which were conveniently placed for that service.

The market for commercial acids was limited up to the date mentioned, and was easily supplied by the apparatus shown in the cuts. About that time, however, the oil and fertilizer trades had grown to proportions sufficient to absorb all the surplus stock of acids, and in order to command a steady supply for

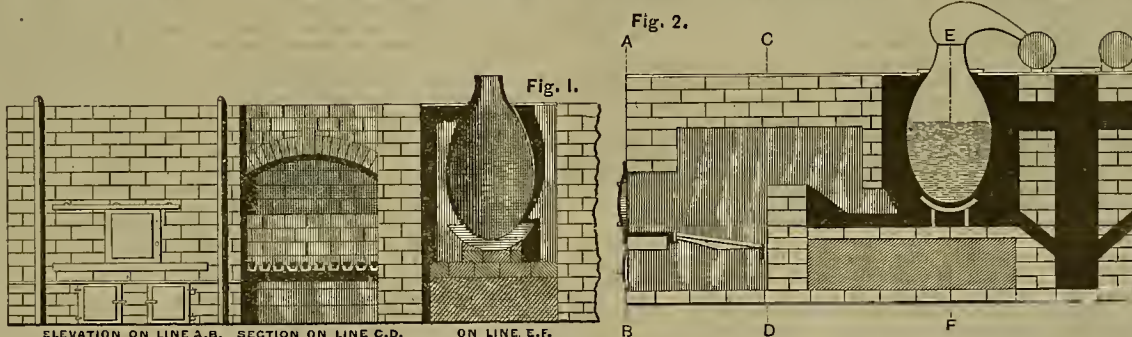
their needs they had become manufacturers.

As exemplifying experiments aiming to accomplish results which were being produced by our own works contained, the process illus-

(Continued on page 277.)



THE PERFECTION "DOUBLE ECONOMIC" STAMP MILL.



Figs. 1 and 2.—General Type of Furnace of 1867-68.

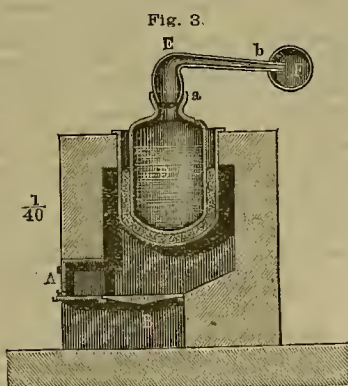


Fig. 3.—Glass Pot with Sand Protection.

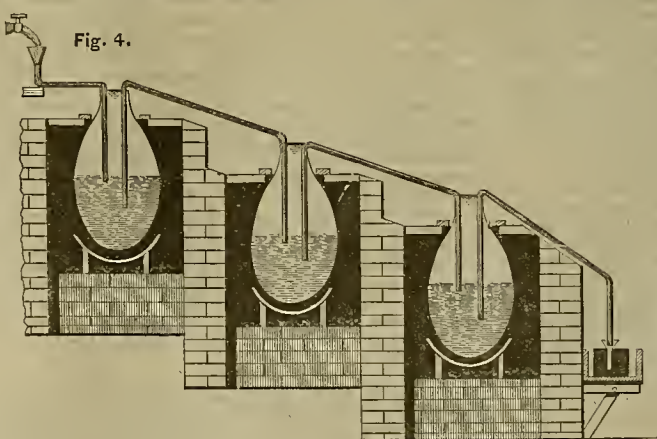


Fig. 4.—Continuous Process.

APPARATUS FOR THE MANUFACTURE OF SULPHURIC ACID.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—EDS.

Conditions in the Tulare Basin.

Artesian Flow.

[Written for the Press by STEPHEN BARTON.]

The developments in the Tulare artesian basin all tend to a refutation of the theory that artesian flows have their sources in the drainage of higher ground, and to cause us to inquire into the character of the formation before we undertake to declare as to whether artesian water may not be had on the summit of an island and hundred of miles at sea. I will therefore undertake to present to your readers some of the conditions made manifest by past observations here.

Without being too precise, I will say that high-water mark in Tulare lake is about 202 feet above the sea; that its present level is about 171, and that consequently the lake has lowered about 31 feet, and that at its present level it is somewhere about 22 feet above the San Joaquin, at the mouth of Fresno slough. In 1868, when the lake was somewhere from 26 to 34 feet above its present level, it was outletting an immense stream through the channels just named. For several miles on the line of this outlet there are deep pools of water which are from 5 to 20 feet above the present level of the lake. I instance these facts to show that there is no subterranean drainage of the lake down the valley. Still another fact is that the first successful development of an artesian flow in this valley was within this outlet of Tulare lake, and after the lake had subsided 10 or 15 feet below the point of discharge. But still it was possible that the lake might have a drainage directly toward the sea, beneath the Coast Range.

The next efforts in the way of developing an artesian flow in this basin was to the south and east of the lake, when many flowing wells were obtained at an altitude of 260 feet above the sea. Subsequently Cuthbert Burrell struck a second and very powerful flow in the outlet of the lake, which was something like 40 feet above the present level of that ever-fluctuating body of water.

Recently successful borings have been made near Huron, west of the lake, and near the base of the Coast Range. The altitude of these last borings is not determined, but they are believed to be pretty considerably higher than any flow obtained east of the lake, and leave the inference that artesian water may be had at any point on the shores of Tulare lake 40 feet above its level, and that the flow is not toward the sea.

Evaporation alone must account for the water lost in this inland sea, and we are left to look in some other direction than the drainage of higher ground for the source of artesian supply. We must look then to the chemistry of the water itself for an explanation of the enigma.

If we should find that all artesian water contained sulphureted hydrogen and hydrogen free, as well as in all its other combinations, we might infer that there had been a decomposition of water deep down in the earth, and that the superincumbent fluids were lifted by the expansive force of this disengaged hydrogen gas. We are almost forced to the conclusion that hydrogen escaping from the earth's interior was from the decomposition of water, because its great levity would prevent it from entering the earth as a gas and it has but few known combinations.

I believe a cubic foot of granite is conceded to contain much more oxygen than a cubic foot of water, notwithstanding the water is eight-ninths oxygen, i. e., a cubic foot of granite contains over 90 pounds of oxygen and a cubic foot of water 54. It is plain then that in the metamorphism which converts sedimentary rocks to granite, both heat and hydrogen must escape to make room for this lessening of bulk. May it not be then that the process of granite making is the parent of all artesian flows?

The question is one of interest to the miner as well as the scientist, and deserves a more careful examination than can be given to it by this epistolary correspondence.

The Australian coal miners have not as yet settled their differences with the mine-owners, and now there are rumors of labor troubles among the English and Scotch colliers. The Pacific Coast coal mines are shipping liberally, and are strenuously seeking to increase their output so as to avail themselves of the present market, which leaves them remunerative profit. The very heavy arrivals of last month from Australia are being discharged and yarded, and by the end of this month will all be cared for, and the outlook then is, jobbers will further advance their quotations, as the quantity of Australian and English now en route is becoming very light.

There is again talk among railroad officials of building a bridge across Carquinez straits. The exact location of the bridge is yet undetermined, but the latest idea of the railroad company is said to be to use the high bluff opposite each other at Vallejo Junction. The bluff on one side of the bay is right at North Vallejo, while the other is close to the edge of the bay at Vallejo Junction. They are considered to be high enough to give a bridge a sufficient height to allow any vessel to pass underneath.

Agricultural or Mineral.

Register Hetzel and Receiver Linthicum of the United States Land Office have each forwarded to Washington opinions in a case entitled "Central Pacific Railroad Company, applicant, vs. S. D. Valentine, mineral contestant, and any mineral claimants." The case is one of great importance, and the final decision of the General Land Office will be watched with interest. The two gentlemen arrive at opposite conclusions, as will be seen by the following finding of facts and conclusions of law as given by each, which we take from the *Record-Union*:

The Receiver's Opinion.

Mr. Linthicum's finding of facts is as follows: In 1865 or 1866 the Rising Sun mine was discovered and located in Section 33, and patent was obtained for the same in 1870 without protest from the Central Pacific Railroad Co. Said Rising Sun mine was operated until 1882, and gold of the value of \$2,000,000 was extracted therefrom. In 1882, said mine having ceased to be profitable, work thereon was discontinued and has not been resumed.

The Milford mining claim, now known as the Big Tree mine, was originally located in 1866, subsequently bought by the Rising Sun Co., and work was done on the location by the Rising Sun Co. up to 1880. The ledge was considered a parallel ledge to that of the Rising Sun. The quartz formation and country rock are the same in both mines. Said Milford claim was relocated by Werry and Nichols as the Big Oak Tree in 1883, and has been actively and continuously worked since then. About \$30,000 had been taken out of the mine prior to the destruction of the hoisting works by fire in August, 1887, and recent extensive improvements have been erected thereon.

Lying around and adjoining the Rising Sun mine are four mining claims, to wit: the Big Oak Tree, Little Pine Tree, Werry and Golden Eagle, to each of which quartz, in place-bearing gold, has been discovered of sufficient promise to justify the development of the same. These four locations lie within Lots 1, 2, 3, 4 and 5 of the southeast quarter of Section 33 aforesaid, and embrace a part thereof. The testimony does not show that any of those lots are mineral in character, except within the limits of said four mining claims.

The only land claimed to be non-mineral in character by reason of the exhaustion of the mineral and abandonment, is a portion of the southeast quarter of Section 33; lying between the Rising Sun mine and Bear river. The testimony shows that there was some surface mining in a ravine running down the Rising Sun mine to Bear river, and also in the bed of said river, between the years 1857 and 1862, both of which were abandoned in 1862, and have not been worked since.

His conclusions are as follows:

That the lands embraced in the mining claims known as the "Big Oak Tree," "Little Pine Tree," "Werry" and "Golden Eagle," are all mineral lands.

That all of lots of said section which are not embraced in the said mining claims, and the pretended ground of the Rising Sun mine, are agricultural in character.

That a survey should be ordered to segregate the mineral land embraced in said mining claims from agricultural land, of which the remainder of said lots is comprised.

The Register's Opinion.

Mr. Hetzel's finding of facts is as follows: That the Central Pacific Railroad Company of California actually constructed and had in operation as early as September, 1865, their railroad through the land, and no change in the route has been made since that date.

That by official survey, approved by the Surveyor-General of the United States for the District of California December 26, 1865, the whole of Section 33 of said township became identified as an odd-numbered section, within five miles of said road, as actually located and constructed.

The whole of said Section 33 was, after the said location and construction of said railroad, duly returned by the Surveyor-General as agricultural land, and no part of it was returned or denominated as mineral land.

That at the time of said return of said land by the Surveyor-General and the construction of said road there were no mines in operation upon said lands, nor upon any part of said Section 33, nor was any part of said Section 33 known to be valuable for mineral land.

That the railroad company's rights to the land in question acquired precision on the 26th day of December, 1865, and vested as of date July 1, 1862.

That the first discovery of mineral on said section was in March, 1866, when the tract known as Mineral Lot 37 was located by one Neff as the Rising Sun quartz claim; that the same subsequently went to patent from the Government, and that it was subsequently by its owners deemed exhausted, and has not been worked since 1882.

That after the location of the Rising Sun mine and about April, 1866, another mining claim was located upon Lot 3 of the southeast quarter of said Section 33, being a part of the land in controversy, and was called the Milford claim, but it was not operated as a mine, nor was it proved to be valuable for mineral purposes until after its relocation in 1883, under the name of the Big Oak Tree mine,

by the assignors of the present mineral contestant.

That said Big Oak Tree claim now contains a known mine, and is of more value for mineral than agricultural purposes; that it was not proved to have any value for mineral uses until subsequent to 1883.

That all the other mining locations on the southeast quarter of said Section 33 consist of quartz claims surrounding the Rising Sun mine, none of which have been worked as mines, or proved to contain mineral in quantities sufficient to pay the expense of extraction, and that all of them have been located since the relocation of the Big Oak Tree mine in 1883.

That there are no placer or gravel claims upon any of the tracts in question.

That the land in all of the said tracts is agricultural land, adapted for fruit trees and vines.

His conclusions of law are as follows:

That the title of the Central Pacific Railroad Company, under the Act of Congress, became vested as to all the lands in the southeast quarter of Section 33, as of date, July 1, 1862.

That at the time said title vested none of the lands in the section were within any exceptions from the grant by reason of any status as mining lands.

That the subsequent discovery of minerals in paying quantities on that part of Lot 3 of said southeast quarter occupied by the Big Oak Tree mine does not affect the right of said railroad company or its grantees.

That the Central Pacific Railroad Company is entitled to patent for all the tracts, the subject of this hearing.

Electric Power for Mines.

The managing director of the Consolidated Esmeralda Co. has returned from Aurora, Nev., and has made a report to the chairman and directors in London. Among other things in his report the following recommendation will be read with interest:

I have carefully considered the question of motive-power, and have obtained the necessary information respecting the transmission of power by electricity. As already advised, I secured the water rights of Walker river, and sufficient land for the erection of such machinery as may be required. The plant to secure a transmission of 200 h. p. mechanical would cost about 10,000. This is largely in excess of the power now used. The saving effected by the substitution of electricity would, in less than two years, repay the entire outlay. I would here mention that the use of water as a motive-power to be conveyed to the mill and mines by electricity is of the greatest importance, and the adoption of the same, with adequate milling capacity, will materially affect the future of the company, as tens of thousands of tons of low-grade ore now in sight will be worked at a profit, and the Consolidated Esmeralda will be one of the largest bullion-producing companies. Pending the erection of this plant, our present 20-stamp mill can be used for the reduction of ore of high grade, such as is now being obtained from the Durand mine. In conclusion, I am able to congratulate the shareholders on the improved prospects. The great problem of the Esmeralda district has been solved by the proof that the veins that yielded so many millions on the surface do continue in depth, and while gaining strength maintain their richness. The enormous yield from the surface caused great excitement—the yield in depth will probably be equally great, in which case Esmeralda will regain, and for many years hold, the high position lost in the years 1863 and 1864 through ignorance in mining and the gambling spirit affecting all holders of mining stocks at that time.

A communication from the secretary of the company states that "the use of electricity as a motive-power, and the erection of a larger mill, are questions now being considered by the board, and it is hoped that arrangements will be made for the erection of this machinery under conditions by which the company will be greatly benefited. The bullion returns from the Durand mine since January 1st amounted to \$36,540. The total expenditure during the same period, \$31,462. This amount includes the cost of erection of hoisting works, purchase of new boiler, alterations and additions to the mill, prospecting other mining claims, and a considerable increase of stores. It must also be borne in mind that the main shaft has been sunk over 100 feet additional, which (as per the superintendent's report) has been the means of developing a vein 7 feet wide, 'all milling ore.' At the beginning of the year the vein was 2 to 3 feet wide, with only 8 to 16 inches of milling ore."

IMPORTANT, IF TRUE.—Edward Atkinson's Boston economist, says a New England genius has recently discovered a cheap method of dissolving zinc by combining it with hydrogen and producing a solution called zinc water. This liquid, applied to certain woods—notably white wood—makes it absolutely fire-proof at a low cost. Atkinson regards this discovery as one of the most important of the age—one that will surely revolutionize fire insurance, as well as immensely decrease the loss by fire.

AMONG new life-saving stations to be established is one between the Ocean house and Point San Pedro, south of the entrance of San Francisco bay.

Casa Grande District.

A correspondent of the Phoenix (A. T.) Herald says: Casa Grande is destined in the near future to be a place of much importance, for there is every evidence that the many paying mines to the north and south will soon be in active operation, and it is already the shipping point for all the trade of Pinal and Gila counties, with Globe, Pinal, Silver King and Florence as valuable tributaries. Then, too, the southern country, clear to the Sonora line, is filled with promising mining camps that find their nearest base of supplies at this point.

The Jack Rabbit is a most valuable piece of property, having furnished shipping ore for several years, and showing no signs of giving out. On the contrary, as is the case with all the mineral deposits in this group, it increases in richness as a greater depth is obtained. The developments on this property are an incline on the ledge; a second incline further north on the same ledge, 120 feet in depth; and a 200 foot tunnel from the foot of the south incline. The formation is lime and porphyry, and the pay rock is a heavy spar carrying an average of \$15 gold and \$400 silver to the ton. There is a streak running through the ledge, on the footwall, that is almost pure chloride of silver, or, in miner's parlance, "horn silver," and this runs way up in the thousands; and the footwall itself, which is of porphyry, is flecked to the depth of six inches with large flakes of horn silver. For shipping purposes, however, the ore is sorted down to an average of \$400 per ton, and during the last 18 months over \$75,000 worth of ore has been shipped and worked at El Paso. Mr. John Moran has charge of the mine.

The Boomerang is a ledge of gold-bearing quartz, running through a formation of porphyritic and talcose slate; there are four or five claims on the ledge and among them the Boomerang is at present in the highest state of development. The ledge, which at the surface was less than one foot in diameter, is now, at a depth of 40 feet, three feet in width and pays by shipment \$60 per ton. There is also a shaft of 30 feet, and several other minor workings, all in pay ore.

As is natural, none of these properties have been offered for sale, as they have given their owners a satisfactory income from the grass-roots down. Some of the mine-owners in this district only work their properties when they need money. For instance, they will go to work and "knock out" a carload of ore and obtain return ranging from \$3000 to \$6000 and then quit work until the money is spent, when they go to work again.

Among the other paying mines in the district are the Southern Pacific and the Central Pacific, two claims on the same ledge that have been shipping ore at a large profit for years. They are about one mile south of the Jack Rabbit and are owned by John Reiss and Tomlinson. The Orizaba, one mile west of the same property, is owned by John Kron and has been worked at intervals since 1881, shipping in that time some \$75,000 worth of ore. The Wall Street, a parallel lead with the Jack Rabbit, has been shipping rich pay ore to the Vekol mill, 15 miles across the Santa Rosa valley, with most satisfactory results. A little to the southeast of the district, in another spur of the Slate range, is the Lake Shore copper mine, an immense deposit of high-grade copper ore; and there are nearly 40 other paying mines in the district.

A HAPPY CAMP.—All prospecting miners agree that Hawthorne is the "hoss camp" for men of small means. When a man strikes pay there, he begins taking out money at once, and without the aid of expensive machinery. Devil's Gate (Silver City) is another district that is much the same, and in Junho district the mines are still more like those in the vicinity of Hawthorne. In all parts of the country, outside of the Comstock silver belt, are small veins of gold-bearing quartz that are quite rich. In the early days, miners who found them, neither located nor worked such veins. They said of them contemptuously: "They are nothing but little feeders." They looked about to ascertain if they led to any large vein (mother vein), and if no such vein could be seen that was the end of the search in that spot. Now men are going for these so-called "feeders," and in very many cases they are found to lead to rich pockets and successions of pockets strung together like links of sausage. It is found that the "feeders" are feeders of pockets lying at no great distance below the surface.—*Virginia Enterprise*.

OAKLAND HARBOR.—Bids will be opened on November 13th for contracts on the Oakland harbor improvements, and work is expected to commence by December 1st. On five different pieces of work about 300 men will be employed. Some of this work will be completed in a few months and other parts will be unfinished after the appropriation of \$350,000 shall have been exhausted. It is proposed to complete the jetty, widen and deepen the channel, dig out the basin at Brooklyn and build half the canal to San Leandro bay.

THE Good Hope mining property in Pinacata mining district, San Diego county, has been sold to a company, and active operations will be commenced in properly developing the claims.

The Russell Process.

Its Practical Application and Economic Results.

(Continued from our last.)

d. At Sombierete, Zacatecas, Mexico.—Table XXXV gives the results of the full course of preliminary mill tests made at Sombierete to determine the applicability of the Russell process, the ore being roasted in reverberatory furnaces and leached in charges varying from 325 pounds to 4.5 tons. The first three leaching tests were made on very fine and pure pyrites alone. On account of its fineness, and not containing any gangue, it became matted during the roasting. Hence the mill results by the extra solution fell short of the extra in the assay office by 5.9 per cent. The fourth set of mill tests illustrates the injurious effect, on the results by extra solution, of wetting down the roasted ore while it is red-hot, the mill results by the extra solution falling 4 per cent below the results in the assay office by the extra solution.

TABLE XXXV.

COMPARISON OF THE RUSSELL PROCESS WITH THE OLD OR ORDINARY LEACHING PROCESS AT SOMBIERETE, ZACATECAS, MEXICO (ACID-ROASTED ORE).

Description of charges.	Weight of charge.	Value in ounces silver per ton.	Per cent extra ton by ordinary solution in assay office.	Per cent extra ton by extra solution in assay office.	Per cent extra ton by Russell process in mill.
Finest pyrites from the flint, crushed thro' an 8-screen—3 charges.....	325 lbs. 75.8 73.5 90.9 85.9				
Coarse and fine jig-products, mixed half and half, crushed through an 8-screen—1 charge.....	325 lbs. 65.4 67.4 91.8 90.8				
Coarse jig-products, crushed through an 8-screen—5 charges.....	325 lbs. 33.4 76.7 86.2 86.5				
Normal mixture of jig-products, crushed through an 8-screen—4 charges.....	325 lbs. 44.9 80.6 90.6 91.3				
Normal mixture of jig-products, wet down while red hot—3 charges.....	4½ tons. 35.4 77.5 84.6 80.6				
Normal mixture of jig-products, not wet down while red hot—5 charges.....	4½ tons. 36.5 74.0 89.3 88.0				

At the time of making all the above tests, the mill results by the ordinary solution were averaging very much below the results by the ordinary solution in the assay office, so that the actual differences in the mill results in favor of the Russell process, as compared with the ordinary process, averaged 22.6 per cent of the value of the ore. The difference in actual cleanup in silver was a little greater, as the cleanup from the ordinary process fell a little short, while the cleanup from the Russell process was slightly in excess of that called for by the apparent extraction. Since Mr. Watson has had charge of the Sombierete mill both the mill and the assay-office results have been very much higher.

e. At Cuahuirachic, Chihuahua, Mexico.—Table XXXVI gives the comparison of mill results at Cuahuirachic by the Russell process and the ordinary leaching process, during a period of 9 months. The "mixed" months, referred to in the table, are those in which the extra solution was used on a portion (about one-half) of the charges. During the other months either the extra solution alone or the ordinary process alone was used for the whole month. The comparison between the two processes is in favor of the Russell process, as follows:

By the use of the extra solution the time of leaching is reduced 34.8 per cent; the apparent extraction is increased 6.5 per cent; the expenses per ton are reduced \$1.29; the net mill profits per ton are nearly doubled; the gross mill product per month is more than doubled, and the net mill profits per month are more than trebled. It will be noticed that the ore during the months when the extra solution was used was 4 to 5 ounces higher in value than while the ordinary process was in use. Making corrections accordingly, i. e., reducing the value of the ore to 35.1 ounces, this comparison would be in favor of the Russell process by 50 per cent greater net profits per ton, 86.2 per cent additional gross product per month, and 149 per cent additional net profits per month.

During the nine months referred to a discrepancy nearly always existed between the apparent and its actual extraction, both while using the ordinary and the Russell process. Part of this (3.2 per cent) was due to volatilization and loss by dust in roasting the sulphides. This was remedied by substituting steam-drying for roasting. Another portion (2.8 per cent) was found to be due to incorrect assaying of the sulphides. Another portion was due to incorrect determination of the weight of ore leached. The only means of approximately determining the weight of ore treated was by the cubic-foot system, which consists in calculating the weight of the charge from the weight of one cubic foot of ore from each charge and the number of cubic feet in the charge. Careful experiments showed that this method gave 6 per cent more ore than was actually present in the charge. But this approximate method was better than none. At intervals, careful experiments were made to determine whether any dis-

crepancy really existed between the apparent (i. e., the extraction calculated from the value of the tailings as compared with the value of the ore) and the actual extraction (i. e., the product in silver). In all, six of these tests were made during a period of nine months, the weight of ore used each time, varying from 18 to 94 tons, being carefully determined.

The total amount of ore treated in these special tests was 279.1 tons. The average "actual" extraction (or cleanup) was 87.9 per cent, which is 1.7 per cent above the "apparent" extraction. No. 2 (of the six special tests) shows both an apparent and an actual extraction of over 79 per cent by the ordinary process. * * *

TABLE XXXVI.

THE RUSSELL PROCESS COMPARED WITH THE OLD OR ORDINARY LEACHING PROCESS AT THE CUI MILL, COMPARISON OF "ORDINARY," "MIXED" AND "RUSSELL" PROCESSES, MONTHS FOR NINE MONTHS (SEPT. 12, 1886, TO JUNE 1, 1887).

Process used.	Value of ore in ounces silver per ton.	Average total leaching time, hours.	Per cent apparent extraction in mill (by tailings).	Value of product in ounces per ton.	Total mill expenses per ton, leached.	Total mill product per month.	Net mill profit per ton.	Net mill profit per month.
Ordinary process.	35.1	66	78.3	8.681	\$13.37	\$19.00	7.31	7,336
Mixed process.	36.8	46	82.3	7.985	12.92	27.60	12.42	13,724
Russell process.	33.0	41	84.8	8.201	12.08	42.83	15.11	24,436

On San Antonio ore, or on a mixture of San Antonio and San Bartolo, the extraction by the ordinary process averaged much less than this, the difference in extraction between the ordinary and the Russell process being 15 to 34 per cent of the value of the ore, as shown in Table XXXVIII.

This set of special millruns was made to determine the exact difference caused by the use

TABLE XXXVIII.

SPECIAL MILL-RUNS BY RUSSELL PROCESS ON CHARGES ALREADY TREATED BY THE ORDINARY OR OLD LEACHING PROCESS, AND ON WHICH THE VALUE OF THE TAILINGS COULD NOT BE FURTHER REDUCED BY THAT PROCESS.

Number of charges treated.	51	11	11	19	92
Number of tons treated.	450	97	82	174	803
Value of ore in ounces per ton.	44.0	40.5	42.6	48.8	43.0
Per cent of salt used.	11.2	11.2	12.6	15.6	11.8
Per cent extracted by ordinary process in assay office.	78.3	78.3	82.3	84.8	78.3
Per cent extracted by extra solution in assay office.	89.0	89.0	89.0	89.0	89.0
Mill tailings after ordinary process and before Russell process.	13.4	13.0	15.6	17.4	17.1
Mill tailings after Russell process.	6.5	6.2	7.1	7.7	7.3
Mill per cent after ordinary process and before Russell process.	62.6	63.0	67.1	69.3	69.3
Mill per cent after Russell process.	89.0	89.0	89.0	89.0	89.0
Difference between ordinary and Russell process in mill in ounces per ton.	6.6	6.8	7.8	10.8	9.9
Difference in per cent of value of ore.	15.6	19.2	19.0	34.8	22.4
Amount of silver called for by difference in tailings, Total ounces.	"	"	"	"	"
Silver obtained in furnace-dried sulphides, ounces.	"	"	"	"	"
Silver obtained in roasted sulphides, ounces.	"	"	"	"	"
Per cent discrepancy based on dried sulphides.	"	"	"	"	"
Per cent discrepancy based on roasted sulphides.	"	"	"	"	"

of the Russell process as compared with the ordinary leaching process, both in regard to the value of tailings and in actual product in silver. The ore was mixed—San Antonio and San Bartolo. In order to get the best possible results by the ordinary process, the percentage of salt used in chloridizing was increased, and each charge of ore was leached continuously (some of them for five or six days) by the ordinary process, until for two consecutive days the tailings remained the same and it was evident that no further reduction in the value of the tailings could be accomplished by the use of the ordinary process. The extra solution was then used on the same charges, and reduced the value of the tailings to the extent of 9.8 ounces per ton. The increase in the per-

centage extracted, due to the use of the Russell process, was 22.4 per cent of the value of the ore. The increase in "actual" extraction (product in silver) due to the use of the extra solution exceeds the amount called for by differences in tailings to the extent of 2.2 per cent in dried sulphides and 0.8 per cent in roasted sulphides. The differences caused by the use of the extra solution was 22 to 24 per cent, both in apparent and actual extraction.

f. At Yedras, Sinaloa, Mexico.—Table XXXIX gives the comparison in mill results of the extra solution with the ordinary leaching process for a period of two months at Yedras. This was with an experimental run, the Russell process being used on charges of only one ton each.

TABLE XXXIX.

COMPARISON OF MILL-RESULTS BY RUSSELL PROCESS AND BY THE ORDINARY LEACHING PROCESS IN THE YEDRAS MILL FOR A PERIOD OF TWO MONTHS.

Value in oz. per ton.	By Russell Process.	By Ordinary Leaching Process.
Value in oz. per ton.	60.6	63.5
Per cent by ordinary in assay office.	68.9	70.6
Per cent by extra in assay office.	82.7	83.1
Mill per cent.	64.5	82.6

The difference in mill results is 18.1 per cent, or 11.2 ounces per ton in favor of the Russell process. Table XL gives the comparison between the extra solution and the ordinary leaching process as to mill results, expenses and net profits per ton.

Run No. 1 is the one referred to in Table XXXIX. As no exact record of additional expenses was kept for this run, the expenses are taken the same as in Run 2, in which the record of expense was carefully kept.

The second run gives the comparison of the ordinary process for five months previous to November 1, 1887, with the Russell process

TABLE XL.

COMPARISON OF THE RUSSELL PROCESS WITH THE ORDINARY LEACHING PROCESS OF THE YEDRAS MILL, COMPARATIVE MILL-RESULTS, EXPENSES AND NET PROFITS.

Value of ore, oz. silver per ton.	No. of Mill Run.	1st.	2d.
Ordinary in mill short of ordinary in assay office, oz. per ton.	50.03	55.64	
Ordinary in mill short of extra in assay office, oz. per ton.	2.7	3.7	
Extra in mill above ordinary in assay office, oz. per ton.	11.3	9.0	
Extra in mill short of extra in assay office, oz. per ton.	7.44	5.33	
Gross difference per ton in favor of the Russell process, oz.	0.13	0.17	
Additional cost per ton of Russell process, \$1.65	10.10	8.85	
Net difference per ton in favor of Russell process.	\$8.45	\$7.21	

for the three weeks between November 1st and 23d, the process not having been introduced in the mill until November 1, 1887. Yedras being so remote and inaccessible, the price of chemicals per pound is very high, the average price being 10 cents per pound as compared with 4.75 cents in the mining camps of the United States. The weight of chemicals used per ton is 13 pounds for the ordinary process and 6.1 pounds additional for the Russell process. The average of the run shows the superiority of the extra solution to the extent of \$9.48 gross profit, or \$7.83 net profit per ton.

The following statement shows comparison of the mill extraction by the ordinary process at Yedras for 7 months, June to December inclusive, with that of the Russell process for November and December:

MILL EXTRACTION AT YEDRAS.

Month (1887)	By Old Process.	By Russell Process.
June.....	71.1 per cent.	
July.....	66. " "	
August.....	66. " "	not in use till November.
September.....	73.1 " "	
October.....	63.1 " "	
November.....	63.7 " "	\$1.2 per cent
December.....	67.3 " "	\$2.2 " "

B.—Comparison with Amalgamation.

a. At Lake Valley, New Mexico.—Table XXXIV gives the mill extraction by the Russell process and by amalgamation on roasted ore at the Lake Valley mill, the difference in favor of the Russell process being 12.4 per cent of the value of the ore. The leaching charges are 18 to 20 tons, while the amalgamation charges are 1.5 to 2 tons. The amount of water for amalgamation was about eight times that used in the leaching. The difference in expenses could not be ascertained, as the amalgamation was at the rate of only 3 or 4 tons per day. Probably the difference in expenses would not have been less than \$5 per ton in favor of the Russell process.

b. At the Ontario in 1883 and 1884.—Table XLI illustrates the comparison in mill results between the Russell process and amalgamation on Ontario-roasted ore during Mr. Russell's experiments at that mill. The amalgamation tests were necessarily confined to ore crushed through a 30 mesh screen and roasted with 16 to 18 per cent of salt. But the leaching tests were made on ore crushed as coarse as a 16 mesh and with all percentages of salt, from 18 down to 0. The table shows that the results of leaching on ore roasted without any salt were only 4 per cent less than the results by amalgamation on ore roasted with 18 per cent of salt. Also, that ore crushed through a 20-mesh screen and roasted with 12.5 per cent of salt, the extraction by leaching was 4.5 per cent greater than by amalgamation with finer crushing and 3.5 per cent more salt. The average results by leaching on ore crushed through

a 16 mesh screen with 12 per cent of salt, were also higher than those by amalgamation on ore crushed through a 30-mesh screen and roasted with 17.5 per cent of salt. The amount of water required for amalgamation was 2.3 times as great as that used in leaching. The milling

TABLE XLI.

THE RUSSELL PROCESS COMPARED WITH AMALGAMATION. RESULTS ON THE LARGE SCALE AT THE ONTARIO MILL, PARK CITY, UTAH, 1883 AND 1884.

Process Used.	Per Cent. of Salt.	Size of Screen.	Weight of Charges, Tons.	Per Cent. Extract'd.
Russell Process.....	0	30	2	84.0
Amalgamation.....	18.2	30	1½	80.4
Russell Process.....	0	30	2	85.7
Amalgamation.....	18.2	30	1½	80.3
Russell Process.....	0	30	2	91.2
Amalgamation.....	15.9	30	1½	92.5
Russell Process.....	12.5	20	2	91.0
Amalgamation.....	15.9	30	1½	92.5
Russell Process.....	8	16	2	92.0
Amalgamation.....	17.9	30	1½	96.1
Russell Process.....	12	16	2	97.1
Amalgamation.....	17.3	30	1½	92.5
Russell Process.....	16	16	2	95.7
Amalgamation.....	17.5	30	1½	95.5
Russell Process.....	18	16	2	95.1
Amalgamation.....	17.5	30	1½	93.3

expenses by amalgamation for the year during which these experiments were made averaged about \$15 per ton. On the other hand, as shown by the expenses for a similar ore in the United States, deducted from the cost expenses, the corresponding cost in a mill using the Russell process would probably be at least \$5 per ton less.

(To be Continued.)

The Mines of Sparta.

The Bedrock (Oregon) Democrat says:

The town of Sparta, situated in the southeastern portion of Union county, Oregon, and about 30 miles northeast of Baker City, is the center of a mineral belt extending for miles in either direction, and mines, both quartz and placer, are being worked with most gratifying results. The first discovery of this camp was brought about in the year 1865, when rich deposits of gravel were found in numerous gulches, which afforded the lucky finders grand returns with the rooker and pan. Many thousands of dollars were taken out by this crude method of working, but it was not until the year 1871 that they attracted wide-spread attention. At this time the gigantic enterprise of building the Eagle creek canal was completed, and an abundance of water was brought into the camp from the head of Eagle creek and turned into the heads of the various gulches, affording the miners the opportunity to equip their claims with hydraulics, etc., which they were not slow in taking advantage of, and for years, and up to the present time, thousands upon thousands of dollars of the precious metal have been the annual output. Probably no camp in the Northwest proved richer than Sparta, and from present indications the camp will turn out a creditable production for years to come. Within the past few years the attention of mining men has been drawn toward the rich quartz deposits of this camp, and it goes without saying that there are few, if any, richer gold quartz districts in the Northwest.

The principal group of mines of Sparta are the Del Monte, and with proper facilities for hauling the immense quantities of ore this property is capable of producing, the profits would be surprisingly large. This property is developed by 800 feet of tunnels and 150 feet of shafts. The ledges are well defined, varying in thickness from six inches to six feet. One thousand tons of ore are on the dump and upward of 10,000 tons in sight. The average ore value in gold is \$22.73 per ton. The lowest assay ever made was \$5.12 and the highest \$94.13 in gold to the ton. The ore is classed as concentrating and is the iron sulphur.

The Mary Ainsworth group, consisting of the Mary Ainsworth, Hidden Treasure and Pacific Chief, situated two miles from Sparta, is attracting the attention of capital, and we are informed that work of a substantial nature will be again commenced under the supervision of Lewis & Co., the well-known mining engineers and contractors of Sparta.

The Free Thinker of Sparta is showing up some of the richest free gold quartz we ever saw.

An enterprise that will prove of great importance to the whole of this section is the organization of the Eagle Creek Mining Co. of Chicago, which will put into successful operation one of the richest bodies of placer mines on the coast.

Sparta, with its vast extent of mineral resources, is destined to create a furor in the mining world, and that, too, at no distant day.

A SMALL army of laborers, stone-cutters and carpenters are at work on the buildings of the Stanford University, and it is likely that a portion of the structures will be ready for occupancy in less than six months. The six buildings forming the rear half of the quadrangle are roofed in and the interior work is going on. The six on the front are making good progress. The buildings are all one story high, with walls of yellow sandstone and roofs of red tiles.

THE report from the United States Assay office at Boise City shows the gold, silver and lead production of Idaho for the year to have been \$8,905,136, of which gold was \$2,522,209, silver, \$3,422,657, and lead, \$2,960,270.



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SAN FRANCISCO

Saturday Morning, Oct. 27, 1888.

TABLE OF CONTENTS.

EDITORIALS.—An Improved Small Stamp Mill; Sulphuric Acid Manufacture, 273. Passing Events; The Copper Trust; California's Mineral Products; San Francisco and Eastern Castings; The Mining Debris Commission; Discharger for Concentrator Belts, 276. The Duke Square Patent Engine, 277.

ILLUSTRATIONS.—The Perfection "Double Economic" Stamp Mill; Apparatus for the Manufacture of Sulphuric Acid, 273. The Duke Double Reciprocating Piston Engine; Continuous Sulphuric Acid Process of 1880; Continuous Process with Porcelain Dishes, 277.

CORRESPONDENCE.—Conditions in the Tulare Basin, 274.

MISCELLANEOUS.—Agricultural or Mineral; Electric Power for Mines; Casa Grande District, 274. The Russell Process; The Mines of Sparta, 275.

MECHANICAL PROGRESS.—Rolling Seamless Tubes or Pipes; A New Husking Machine; Uses and Preservative Qualities of Soapstone; The Weldless Rolled Chain; A Monster Locomotive; Motors vs. Compressed Air; An Electric Crane, 278.

SCIENTIFIC PROGRESS.—What Evolution is Not; The Aurora Borealis; Larger than the Lick Telescope; An Ancient Manuscript to be Reproduced; North Carolina's Underground River; Effects of Soap in Geysers; The Retrocession of Niagara Falls; Standard Time; Submarine Telephony, 278.

USEFUL INFORMATION.—Make Your Own Ice Cream; Artificial Silk; Paper Mache Covering for Pulleys; How Glass Lamps Chimneys were Invented; To Polish Tinware; Sharpening Tools; Hebrew Manufacturers; For Removing Old Varnish; A New Steam Street Car, 279.

GOOD HEALTH.—Yellow Fever; Tough Fruit Skins; Ears Injured by Sea Bathing; The Best Way to Obtain Rest; An Interesting Question; Another Alleged Cure for Whooping Cough; For the Feet, 279.

ENGINEERING NOTES.—The Rival Canals; The Hudson River Tunnel, 279.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 280-81.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 284.

Business Announcements.

(NEW THIS ISSUE.)

Risdon Iron and Locomotive Works.
Assistant Superintendent Wanted—Pacific.
See Advertising Columns.

Passing Events.

The telegraph announces the appointment of the Commission of engineers to examine into the debris question in this State. In a very short time, probably, they will prepare to commence this important work.

A large force of men are at work at the soda works at Keeler. A large refinery is finished and machinery is being put in. The manufacture of soda from Owens lake water has now passed beyond the experimental stage and is a permanent industry. The soda can be made in unlimited quantity.

The action of the French copper syndicate, referred to in another column, is very important to the owners of copper properties. If the price of the metal is forced still higher, there will be a chance for profit in working the mines of California and Nevada.

Tin ore has been found in the Ioyo mountains, not far from Independence Station. The percentage of metal is low, but the ledge is large. The samples assayed are from the surface, and better ore may be found with depth.

Lead miners deplore the Chicago failure since lead broke in value as a consequence. Some of the Utah papers fear the price will not "rally" for some time.

The Copper Trust.

The French metal syndicate or trust, which now controls the copper supply of the world, has been so successful in advancing prices that it intends perpetuating itself for a longer period than was at first intended. Most of the original contracts with mining companies were for three years. The new contracts are to extend over a period of 10 to 12 years. In consequence of the great increase of stocks, negotiations have been for some time pending between the syndicate and the larger producers of copper for a reduction of their output to the extent of 25 per cent, the loss to the mining companies being compensated for by an increase in their contract price. The telegraph informs us preliminary negotiations to this effect have been concluded at Paris. Last month the Bank of England advanced their rate of discount from three to four per cent, and the Bank of France at once followed with an advance to 3½. A further advance in the Bank of England rate is expected. This will considerably increase the cost of holding the present large stocks of copper, now estimated to amount in public and private stores and at smelters' works in England and France to over 105,000 tons, and in the United States to about 10,000 tons.

This represents an outlay of fully \$40,000,000, which will give a pretty good idea in itself of the magnitude of the great French syndicate's operations. For its own protection it must now restrict production. But controlling all the world's copper and the producing mines, it can, of course, increase the price still further and greatly reduce the production. This proposed and necessary reduction of product and increase of prices will permit the mining companies to make as much profit, but it will not be to the advantage of the working miners. It means a reduction of force in mine and works.

Naturally since copper has advanced in price so largely, consumption has fallen off, as the substance is dispensed with as far as possible in the arts. There is a certain amount, however, that must be used, and the people who use it will have to pay well for the privilege.

As far as the mines of this country are concerned they have been benefited by the operations of the Frenchmen. They get a better price for their product and have no trouble in disposing of it. It is the consumer who is "out and injured." Many mines which have not been worked for years are now in operation and more are being opened. It will be seen that from all appearances the price of copper is more likely to advance than to recede.

California's Mineral Products.

California is best known, of course, for its product of gold, and for many years the only mining work done was in the direction of developing deposits of this metal. It still leads all other regions of the United States, or the world, in annual gold production, but many other mineral products are now worked. The borax mines are the largest in the United States, and there is still much ground undeveloped. The chrome mines of California are the only ones in the United States, and the quick-silver product of America is all from this State. We have copper ore in plenty, but few of the mines are being worked. There is plenty of building-stone, gypsum, infusorial earth, iron, cement, kaolin, ochre, lead, silver, sulphur and other mineral products.

The coal mines of the State yield about 12,000 tons a year. The salt production is very large. There is manganese also, but none is being worked at present. The same may be said of the sulphur.

Among those things to which great attention is now being paid are petroleum, coal and natural gas, and developments with these are increasing. Attention is again being paid also to tin. Asphaltum and bituminous rock are also being more utilized than ever before. Lime is made in nearly every county of the State, and there are numerous beds of clay for pottery and brick manufacture. Refineries for soda works are also being erected.

All these varied mineral products will in the future attract more attention than in the past. Many of them will necessitate the establishment of manufactories, and hitherto capital has hesitated to embark in such enterprises. A change is manifest, however, as the industrial development of the State advances.

No State in the Union has more varied min-

eral resources than California. But we have paid so much attention to gold that the other minerals and metals have been neglected. Within the past few years we have begun to realize this, and from this on all the miscellaneous mineral industries will be better developed.

San Francisco and Eastern Castings.

We had a conversation this week with Mr. A. B. Bowers, formerly of this city, but now of Washington, D. C., who is on a business visit to San Francisco. He will leave in a few days for San Diego, where one of the Bowers dredgers will commence work on a million-yard contract in the harbor. The work is to be done for the Coronado Beach Co. Glorieta bay—a high in the main bay—is to be dredged out so as to form a yacht harbor, and the material is to be deposited ashore. The little bay is now bare at low tide, but when the work is completed there will be 7 feet of water. It is on the south side of Coronado beach and close to the large hotel.

The iron-work for the new dredge was made in Chicago, as the principal stockholders in the dredging company are residents of that place. Mr. Bowers says, however, he cannot get any such castings in Chicago as are made in San Francisco. They are coarse and rough, and many have to be rejected. Those that were accepted would not have been taken from the foundrymen here.

The Chicago men do not use good sand for their castings. They take contracts at a lower figure than is done here, but their iron only costs them 1½ cents per pound. By not ramming the sand the casting weighs about one-third too much, and in the end the cost of the work comes up to about as much as it does here. The shop-work on the dredge was, however, done well. Mr. Pierce of San Francisco went on to superintend the work and would accept none that was not first class. They soon found out that if it was not perfect Mr. Pierce would not accept it, and grumbled somewhat as to his being so much more particular than others were. He told them, however, that what they were doing might be all right for usual customers, but it was not for San Francisco people who were used to getting good machine-shop work, and would not be put off with anything second class. The new dredge referred to cost about \$50,000 and is built under the Bowers patents.

A BELT RAILROAD AROUND THE CITY FRONT.

At a meeting of the Board of Harbor Commissioners, W. H. H. Hart spoke upon the proposition of building a belt railroad around the water front. He said he represented the Bay City and Harbor Navigation Company, which was willing to expend \$2,500,000 in the enterprise. The only return asked by the company was the privilege of charging a nominal rental to the railroads making use of the track, all companies to be allowed equal facilities.

THE LICK TRUSTEES are discussing a method of legally paying a portion of the surplus money on hand to the residuary legatees—the California Pioneers and Academy of Sciences. When authority can be had by order of court, some of the money will be paid over.

A GREAT DEAL of the Anaconda matte is now being stored at the smelting works in Montana, while Boston-Montana matte, Arizona and other slag or ingot copper is being stored in New York.

RICH placers are said to have been discovered 25 miles southwest of Nogales. Some of the nuggets found are large. One worth \$200 was brought to San Francisco this week.

THE average pay on Forty Mile creek, Alaska, this year, has been from \$8 to \$10 per day, although some claims paid higher. Wages paid to placer miners were \$8 per day.

THE Paris Temps says that the preliminaries of the new agreement between the copper syndicate and the mining companies have been signed.

CONTRACTS have been let at Tacoma for building new coal-hunkers, which will load nine ships at once. The work must be done in one year.

A COMPANY in London is now manufacturing the Huntington roller-mill. Some of these machines are now working ore in Africa.

The Mining-Debris Commission.

In accordance with the Act of Congress recently passed and approved, the Secretary of War has detailed Major Benyard, Major Heuer and Major Hanbury as a Commission to investigate the mining debris question in this State. The first two mentioned are now stationed at San Francisco, and the latter is at Portland, Oregon. All these gentlemen are officers of the engineer corps of the United States Army. Major Hanbury was formerly a resident of this State, but has been for some years stationed at West Point.

From the nature of their profession, these gentlemen are highly skilled engineers. Those graduates of West Point who show the highest efficiency are usually destined for the engineer corps. The Engineer Department of the army is, as a result, composed of officers of special attainments.

The appointment of this Commission is a most important step in the conclusive settlement of the much-discussed mining-debris controversy. We have now three disinterested experts in engineering matters, who will study up the whole matter and give the people an unbiased report. Their positions are not dependent on political favor of any kind, and they have nothing to lose or gain one way or another.

We may therefore confidently expect an intelligent report that will deal with the subject from an engineering—and therefore practical—point of view. Naturally the principal feature for the Commission to study will be the navigability of the rivers of the State, and how they are affected by debris. If the rivers can be saved, the land can. Then it will be their duty to point out the proper means to be taken to prevent further damage. If they think the mines can be worked without detriment to other interests, they must show how to dispose of the debris. If they can see no way to accomplish this, they must conclude that hydraulic mining must be stopped forever. But if a way out of the difficulty can be seen, the details of the plans will be given us. It is a matter for congratulation to the people of the districts affected that this Commission has been appointed.

Discharger for Concentrator Belts.

George W. Starr and R. M. Kinley of Grass Valley have just obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency on an improvement on endless belt concentrators, like the Frue and Triumph. The object of the improvement is to discharge the sulphurets before the belt reaches the usual washing-tank. The objection to the usual method of letting them pass into the acid tank is, that owing to the agitation in the tank caused by the passage of the belt and its shaking supplementary movement, and by the use of the hoe employed in drawing the sulphurets out, a loss of fine sulphurets is sustained, the finer particles floating away, in spite of all efforts to save them. This is what these inventors claim to be the case, and they also claim that by the use of their discharger, all the sulphurets, both coarse and fine, are precipitated into the receiving-hox, where they will not be disturbed, and in which they can be handled without loss or conducted in distributing pipes to the dry-room, where a large reception-tank may be built, thus saving the labor of one man.

The discharger consists of a rubber strip secured along the top edge of a body piece, the upper end of which is provided with a curved seat on which the rubber strip is secured, so that it is given a curve or cross section to conform to the curve in the belt. The strip is so placed as to be adjustable laterally, and the contact may be accurately adjusted.

Instead of the sulphurets being washed off the belt in a tank of water, they are discharged from the belt by the contact of the rubber strip therewith, with the assistance of a stream of water, so that, instead of passing round with the belt into the underlying tank, they fall into a receiving-hox and may be handled readily. The inventors are aware that rotating scrapers or brushes have been used to scrape off sulphurets from a traveling belt, but claim this particular discharger, curved to conform to the direction of the belt, and made of rubber for rubber belts.

JAMES G. FAIR has been inspecting some mining properties at Colfax.

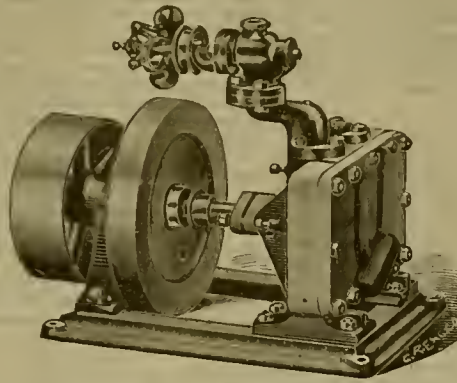
Sulphuric Acid Manufacture.

(Continued from page 275)

trated in Fig. 4 may be cited. Pan acid is run continuously into the upper glass, and thence through the series by means of siphons of annealed glass tubing bent to proper shape. The legs of the siphon are inserted in glass cups (not shown) or bent upward, the better to retain their charge of acid. Differences in gravity between the acid in the upper glass (62° B.) and the lower glass (66° B.), and diminution in bulk by distillation, are equalized by setting the glasses in steps; but so changeable are the conditions when firing with coal that ordinary sized retorts (15 to 20 gallons capacity) are found too uncertain in daily use; and this process was only maintained continuously when five-gallon pear-shaped retorts were employed. While never applicable for extensive service, yet the process can be made useful for several purposes if fired with gas.

Fig. 5 shows a continuous process, originating in Brooklyn, N. Y., which the writer (Mr. Adams) put into use to replace the one last spoken of. It was in very general use from the year 1869, and can yet be found in

through which lip the partially concentrated acid runs to retort No. 2, and thence to Nos. 3 and 4 of the series, a loosely attached glass tube forming the connection from spout to funnel, variable heats, the shocks of the boiling and the action of the sediments. Although this and several ingenious devices of more or less merit have been brought to notice, none of them have



THE DAKE DOUBLE RECIPROCATING SQUARE PISTON ENGINE.

The completed product (65° to 65.5° B.) is cooled in leaden pipes or troughs, set in running water, and from such coolers is taken to suitable storage tanks. The retorts are set in

been commercially successful or deserve particular notice.

THE NORWAY STEEL & IRON CO. OF BOSTON HAS

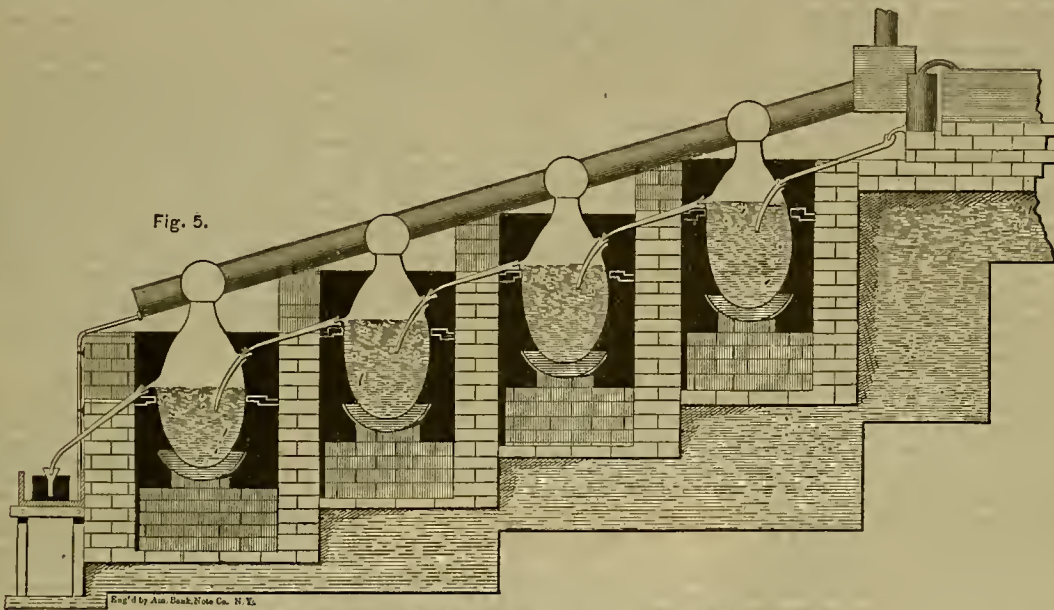


FIG. 5.—CONTINUOUS SULPHURIC ACID PROCESS OF 1869.

Fig. 6.

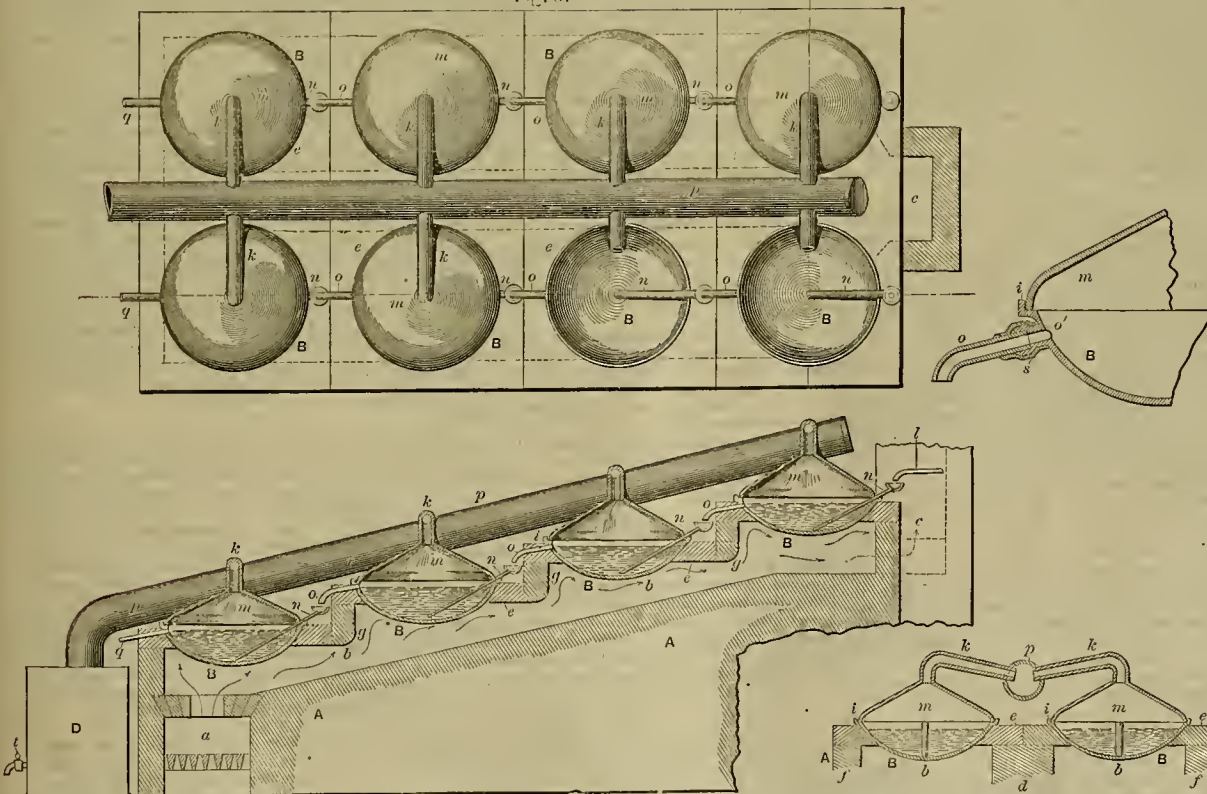


FIG. 6.—CONTINUOUS PROCESS WITH PORCELAIN DISHES.

several of the smaller works. By this process the pan acid (60° B.) runs continuously into the first glass or retort through a funnel which is inserted in an opening in the upper part of the glass. Opposite and below this opening for the weaker acid, a lip or spout is attached to and made, by blow-pipe work, a part of the retort,

cast-iron sangers on a bed of clean dry sand, free from all organic matters.

Fig. 6 shows a process aimed to accomplish like results with the previous examples, porcelain dishes and connection pipes taking the place of glass, and the porcelain, carefully annealed, being depended upon to withstand the

decided to go out of business. Fully 500 men will be thrown out of work. The concern is well known throughout the country, because of extensive dealing in Swedish iron.

ABOUT 50 miners are wintering on Forty-Mile creek, Alaska.

The Dake Square-Piston Engine.

The Dake reciprocating square-piston engine is not a mere novelty, but a reliable motor. It is a double engine with the two pistons in one case and acting as valves for each other. The outer piston moves horizontally backward and forward, and the inner piston reciprocates vertically within the outer one, and these, together with the crank and shaft, comprise all of the moving and wearing parts of the engine. The eccentric valve, valve-rod, piston-rod, cross-head slides and connecting rod, are entirely dispensed with. The engine is automatically lubricated through the steam, the oil getting to every part thoroughly. The engine has no dead centers, the steam acting on the piston at the periphery of the crank, where it has the greatest amount of power, and taking steam alternately on each piston after passing the center.

As will be seen by the accompanying engraving, all the working parts are inclosed. No skilled engineer is needed, the main attention required being to know that the oilers are provided with oil and to occasionally blow off the water of condensation. The engine weighs little and occupies small space. No link or eccentric is used for reversing. It can be reversed instantly at any point of stroke by simply reversing the lever attached to the throttle. It offers many advantages as regards compactness, positive action, speed and durability, and is well adapted for running dynamoes, pumps, blowers, hoists, capstans, steam yachts, and is especially adapted for use in saw and shingle mills, etc., where additional power is needed, without requiring any radical changes or large expense. The agents on this coast are the Stearns Manufacturing Co., 29 and 31 Spear St., San Francisco.

THE returned Yukon (Alaska) miners have all come to the conclusion that, taking into consideration the time consumed in getting in and out of the country, the high price of provisions, and the hardships endured, nothing less than \$15-diggings will pay them for the trip. However, they are free to say that as soon as a road has been built over the portage and steamboats put on the river, the Yukon will be a great country.

THE University of Southern California talks of a 42-inch telescope, but it is more probable that if Clark makes one of that size it will go to the Leland Stanford, Jr., University. A glass of that size could now be made much cheaper than that of the Lick telescope, which is 36 inches.

REPORTS from the Quijotas state that the Peerless mill is working steadily away on old ore which was in the bins, and is making good progress. There is about 150 tons of this ore, which is of a lower grade than that found in the recent development.

THE Paso Robles *Moon* says that the Slack's Canyon coal mines are likely to be abandoned, the developments not warranting the building of a railroad to the mines, and the working force having already been reduced from 30 men to nine.

THE President having approved the Act allowing vessels not carrying passengers to burn petroleum as fuel, the Treasury Department at once issued blank permits to Collectors of Customs for this purpose.

THE Lake Superior Copper mines—10 of the principal ones—for the first eight months of this year, have produced 27,324 tons of fine copper, as compared with 25,140 tons during the same period last year.

THE annual report of the Tamarack Mining Co. of Lake Superior states that the mine produced 5195 tons of fine copper during the past year, at a cost of 53 cents per pound laid down in New York.

THE Bonanza quicksilver mine, near Oakland, Oregon, is producing 15 flasks a month. A new 40-ton furnace is being put up.

SEVERAL prospectors have been killed by the Navajos while searching for the mythical, long-lost Adams mine, N. M.

MECHANICAL PROGRESS.

Rolling Seamless Tubes or Pipes.

Fresh attention has recently been called to the merits of Mannesman's Tube Rolling Process, by which tubes or pipes for water or gas are made directly from an ingot with a small hole through it longitudinally. Mr. Siemens is an enthusiastic champion of the process and has given what he regards as strong reasons for dispelling the incredulity and prejudice which has grown up in regard to the process. The English correspondent of the *American Manufacturer* writes as follows in regard to the matter:

Contrary to many of his contemporaries, Mr. Siemens believes that the process is based on true principles, and that in the Mannesman system manufacturers have to their hand "a method of rolling as new as it is capable of producing effects hitherto not contemplated." Mr. Siemens claims for it that in combining in itself many of the various systems of rolling previously invented, the system may be called the universal system of rolling, in which hitherto all known processes represent a part.

What a Mannesman Process Accomplishes.

Under the Mannesman system, from a rough ingot of steel, either Bessemer, Siemens or basic, with one or two operations, a perfect seam, and with a circular fiber, is produced. Tubes of great length and diameter, and almost of any desired thickness of metal, can be produced at a comparatively low cost, air-tight, and possessing treble or quadruple the resisting power of the best welded tubes of wrought iron.

The New Invention Described.

In describing the new invention, Mr. Siemens remarks that a bar or rod which is passed through the Mannesman rolls will, provided its substance is sufficiently homogeneous and plastic, undergo a violent twisting and stretching action, the fiber being spun as is the fiber with a rope, on account of which the process may appropriately be called a torsional process. The bar in its passage through the mills is twisted in a spinning machine. As, however, it cannot be fed from the outside, as is the thread, and as the diameter cannot be reduced on account of the action of the rolls, it is forced to draw on the interior for a supply of material.

How the Tube Is Manufactured.

The tube is made as follows: A bar is placed between the conoidal rolls at the part where the diameter being least, the speed at which they move to make the revolution is also least. The rolls seize the bar and draw it into contact with parts of the cones, which move more and more rapidly through, owing to the way in which the rolls are set, the space left between them for the passage of the bar decreasing slightly. Slight, however, as is this decrease in the space between the rolls, a certain amount of material has to be shifted. The action of the rolls prevents this material from being taken from the outside of the bar, and, consequently, it is drawn from the interior—hence the hollow, hence the tube.

The Peculiarity of the Mannesman Process.

Soon after entering the rolls a small central fracture is formed, which widens out to a hollow space as the increased stretch is made to take effect on an increased twist acted on from the surface. The increasing twist of the fiber of the bar while passing through the rolls, and the peculiar relation kept up between longitudinal and turning action, is the characteristic of the machine.

Employment of the Mandril in Tube Rolling.

The mandril is generally used to finish and smooth the interior of the top and to enlarge it, but Mr. Siemens explains that it is an erroneous idea that this mandril is necessary to form the hole in the bar. Such an operation is impossible. No machine could stand the strain if it were to attempt to force the mandril longitudinally through a solid bar of hot steel. Specimens of partially finished tubes were placed before the British Association in proof that the hole within the bar was formed without the intervention of the mandril, Mr. Siemens observing that such

Specimens Quite Disposed of the Allegation That the hole was made by the mandril. Tubes manufactured upon this process possess great toughness and resisting power, and their qualities, Mr. Siemens contends, upset the hitherto accepted ideas in shaping metals, inasmuch as it is proved that, instead of avoiding any great twist of the fibers, the imparting to the material of the greatest possible twist with a corresponding stretch by one operation may give it qualities which it would be otherwise impossible to supply. We are likely to hear more of this process in actual manufacture in the future.

A NEW HUSKING MACHINE.—A simple device by means of which the husk of corn can be easily and quickly torn from the ear has been patented by Theodore H. Mehning of Niohara, Neb. The device has jaws which open and close like shear blades, each of the jaws having concave sides, which, when closed, form a cup-like cavity, the meeting edges being cut away at the middle to form an aperture when the jaws are closed. Each jaw has a row of short inwardly projecting teeth around the edge, with a pointed prong on the outer end to guide the ears of corn into the space between the jaws.

The jaws are not in the same plane with the handles, but at a considerable angle thereto, and the large side of the handle has a sharp-edged tooth to be used to cut the silky threads on the ears. The operator holds the husker with his right hand, with his left taking an ear of corn by the outer end, when he opens the jaws and passes the pointed ends over the stem of the ear until the inner end of the husk is inclosed by the jaws, so that the stem of the ear projects through the aperture. The jaws are then closed so that the teeth penetrate the husk, when, with a slight twist, the ear is freed from the husk by breaking the stem.

USES AND PRESERVATIVE QUALITIES OF SOAPSTONE.—Frank C. Goo, all, surveyor of shipping to the Trinity house, Richmond, London, writes to *Iron* as follows: I have for some time experimented with a material called Chinese soapstone as a substitute for the ordinary metallic pigments used in paints, and I have found this soapstone to possess qualities highly calculated to prove an effectual remedy against the danger of rust. In China, soapstone is largely used for preserving structures built of sandstone and other stones which are liable to crumble under atmospheric influences, and the covering of powdered soapstone in the form of paint on some obelisks in China, which were hewn out of stone liable to suffer under atmospheric influences, has been known to preserve the same intact for hundreds of years. Soapstone may, therefore, be said to have extraordinary qualities in withstanding atmospheric influences which have a great deal to do with the corrosion of steel and iron, for it is well known that the inside of a steamer, which is not exposed to the incessant action of salt water, like the bottom, corrodes very much more quickly than the outside. Soapstone has, however, another quality which eminently adapts it as a protective paint on ships, and that is the extreme fineness of its grain. Ground soapstone is one of the finest materials which can be produced, and from the experiments which I have made, I have found nothing to take hold of the fiber of iron and steel so easily and firmly as soapstone. It is, moreover, lighter than metallic pigments, and if mixed as a paint, would cover a larger surface than zinc white, red lead or oxide of iron.

THE WELDLESS ROLLED CHAIN.—The idea of rolling or squeezing chains out of a solid bar of iron or steel is not altogether new. Various mechanisms to perform such work have been devised in the recent past, but it is claimed that the recent invention of Mr. M. J. Jacker of the Bullock Manufacturing Co. of Chicago is the only one thus far which has proven itself to be practical. The bar from which the chain is rolled, or rather squeezed, is so rolled that a cross-section assumes the shape of a four-rayed star, two opposite points of which are smaller than the other two points. The bar is forced through four converging dies. In producing a continuous chain in this way the dies are made continuous by placing them on the circumference of form rollers in equal divisions. The rollers are driven by gear-wheels, so arranged that the four parts of a link will meet accurately in place. Proper clearance is given to the dies to allow the links to leave the matrices free as the roller revolves. As the material is carried forward between the rollers the dies partially press or wedge out the links at right angles to each other, breaking the fine or feather edge that is left on the inside of the link, thus producing a finished chain. The machinery having been proven to be practical, the inventor is now engaged in forming a company to put up extensive works for this class of manufacture.

A MONSTER LOCOMOTIVE is now being constructed for the Atchison & Topeka railroad, which it is estimated will make 80 miles an hour. It was designed by G. S. Storey of New York and carries two cabs, one over the center of the boiler for the engineer and the other in the old style for the fireman. It is the largest passenger locomotive ever built. All the wheels are of paper, with steel tires, and the driving-wheels are the largest ever made. The Worthington steam pump works that a great part of the exhausted steam is pumped back and serves to heat the water in the tank. Another economy in fuel is the work of the large combustion chamber, which burns up all the gas. It is expected that the engine will make 80 miles an hour with ten passenger cars on an ordinary road.

MOTORS VS. COMPRESSED AIR.—Mr. George Cutter, the electrical engineer of Chicago who has recently been making a trip through the mining regions, was impressed with the fact that if the electric motor were used in the mines in place of the compressed air system, it would do away with many of the delays now caused by the use of the latter. Not only the great adaptability of the motor to such work, but its superior safety and economy, will hasten the change proposed.

AN ELECTRIC CRANE.—One of the traveling cranes at the Erith Iron Works, England, which was originally constructed to work by hand, has recently been operated by a dynamo with very satisfactory results. A single attendant now works the machine. Electric power has since been applied to several other cranes, which are giving good satisfaction. Provision is made for varying the power and speed to suit the requirements of the work in hand.

SCIENTIFIC PROGRESS.

What Evolution is Not.

Everybody nowadays talks about evolution. Like electricity, the cholera germ, woman's rights, the great mining boom and the Eastern question, it is "in the air." It pervades society everywhere with its subtle essence; it infects small talk with its familiar catchwords and its slang phrases; it even permeates that last stronghold of rampant Philistinism, the third leader in the penny papers. Everybody believes he knows all about it, and discusses it as glibly in his every-day conversation as he discusses the points of race-horses he has never seen, the charms of peeresses he has never spoken to, and the demerits of authors he has never read. Everybody is aware, in a dim and nebulous semi-conscious fashion, that it was all invented by the late Mr. Darwin, and reduced to a system by Mr. Herbert Spencer, don't you know, and a lot more of those scientific fellows. It is generally understood in the best informed circles that evolutionism consists for the most part in a belief about Nature at large, essentially similar to that applied by Topsy to her own origin and early history. It is conceived, in short, that most things "grew." Especially it is known that, in the opinion of the evolutionists as a body, we are all of us ultimately descended from men with tails, who were the final off-spring and improved edition of the common gorilla. That, very briefly put, is the popular conception of the various points in the great modern evolutionary program.

It is scarcely necessary to inform the intelligent reader, who, of course, differs fundamentally from that inferior class of human beings known to all of us in our own minds as "other people," that almost every point in the catalogue thus briefly enumerated is a popular fallacy of the wildest description. Mr. Darwin did not invent evolution any more than George Stephenson invented the steam engine or Mr. Edison the electric telegraph. We are not descended from men with tails any more than we are descended from Indian elephants. There is no evidence that we have anything in particular more than the remotest fiftieth cousinship with our poor relation the West African gorilla. Science is not in search of a "missing link;" few links are anywhere missing, and those are for the most part wholly unimportant ones. If we found the imaginary link in question, he would not be a monkey, nor yet in any way a tailed man. And so forth generally through the whole list of popular heliots and current fallacies as to the real meaning of evolutionary teaching. Whatever people think evolutionary is for the most part a pure parody of the evolutionist's opinion.—From "Evolution," in *Popular Science Monthly*.

The Aurora Borealis.

Still another German astronomer propounds an explanation of the aurora and zodiacal light. According to this theory, the sun's rays, falling on the earth, are variously reflected as they fall vertically or at an angle more or less obtuse, and the earth being conceived as a large mirror, many of the obliquely incident rays will be reflected to a part of the celestial vault on the right side of the earth. The zodiacal light he ascribes to the irregular reflection of the sunlight from water, and similarly the vast fields of ice in the polar regions, he considers, may be regarded as an imperfect mirror, irregularly reflecting the incident light. The rays which fall most obliquely are the most abundantly reflected, and, as the quantity of reflected light increases with the angle of incidence, it may be seen how the reflected sunlight illuminates in the highest degree the night skies of the region nearest the pole, and, further, the great similarity of the incipient light of the aurora is explained, thus, the latter being also sunlight reflected.

As to the idea that the point of origin of the aurora is indicated by the direction of the magnetic needle, it is claimed, rather, that a line drawn from the sun at right angles to the horizon and prolonged would be the middle line of the phenomenon.

A recent scientific writer refers to the many attempts which have been made to fix the height of the aurora borealis, the various calculations presenting a discouragingly wide range of estimates. At times the aurora seems to rest upon the earth; at other times it has been estimated at two or even three hundred miles high. Later and more careful experiments with improved instruments render it quite certain that 38 miles is probably the height at which the most brilliant auroras take place; that a pale and faint glow may possibly be produced as high even as 82 miles, but that no aurora discharge is possible at a height of 124 miles.

LARGER THAN THE LICK TELESCOPE.—It is reported that a Los Angeles gentleman has been corresponding with the Clark Brothers of Cambridgeport, Mass., in regard to constructing a large telescope for the University of Southern California—one that shall be furnished with an object-glass 50 inches in diameter—larger than that in the Lick instrument. The gentleman is reported to have received a letter from the Clarkes in which they say that they are now quite certain that discs of glass more than 40 inches in diameter can be obtained with a reasonable number of experiments

or trials, and that with their (the Clarkes') experience he would undertake to make and mount a telescope with a 40-inch objective, a photographic lens, spectroscopic apparatus and everything complete for the sum of \$80,000. This was not possible when the Lick instrument was ordered, but has been rendered possible within the last three years. With such an instrument mounted upon an isolated mountain such as Stanford, Whitney, San Antonio, San Jacinto or San Bernardino, 10,000 feet above the sea, much more marvelous results may be expected than the 36-inch objective of Mount Hamilton at 4300 feet elevation has or possibly can reveal.

AN ANCIENT MANUSCRIPT TO BE REPRODUCED. The trustees of the British Museum have given directions that the *Ani* papyrus, a remarkable recension of the "Book of the Dead," shall be reproduced in facsimile, with the illustrations in the colors of the original, and the work is now being executed by Mr. Griggs. This hieroglyphic papyrus was written for a royal scribe, Ani, about the commencement of the 19th dynasty—*circa* 1400 B.C. It is complete, the first and last vignettes being intact. The series of vignettes is a mine of archaeological information; their artistic excellence is equally great. The papyrus contains a chapter of the "Book of the Dead," the 175th, not found complete elsewhere. Also one of the illustrations, a group of lamenting women in violent action of grief, is unknown to any hitherto published copy of the book. It is expected that the reproduction will be completed in the course of the autumn.

NORTH CAROLINA'S UNDERGROUND RIVER.—Reports from Whiteville, the county-seat of Columbus county, North Carolina, state that the citizens are much wrought up over the supposed discovery of an underground river. It is stated that the roaring and rushing of water can be plainly heard in the vicinity of the supposed stream, and that upon placing the ear to the ground "the phenomenon becomes alarming." A press dispatch says: "The sound indicates that the water is not any great distance down, and that it is not a small stream, but a majestic river that is coursing unseen in the bowels of the earth on its way to the sea. Vehicles passing the ground where the phenomenon exists, create a hollow echo from below, and the earth in the vicinity for a great distance around seems to be cavernous, judging from the sounds that follow sharp blows."

EFFECTS OF SOAP IN GEYSERS.—Dr. R. W. Raymond read a paper before the late meeting of the Institute of Mechanical Engineers, at Buffalo, on "Soaping Geysers." It appears that his attention was called to the subject by the story of a party of returned tourists, who told him a story of a Chinese laundryman who set up a washing establishment at the National Park geysers directly over a hot spring, intending to utilize the hot water in his business. On one occasion, having thrown a lot of dirty linen, thoroughly "soaped," into the spring to soak over night, the celestial was very much surprised when the waters of the spring, having become stimulated by the soap, suddenly became a spouting geyser, and forced up with a rush a large quantity of hot water, completely wrecking his establishment and thoroughly demoralizing its owner.

THE RETROCESSION OF NIAGARA FALLS.—At a late meeting of the Institute of Mining Engineers, held at Buffalo, Dr. Julius Pohlman presented a sketch of his views on the "Life History of Niagara Falls," in which he took the ground, elaborating his evidence, that the falls have not cut their way back from Lewiston, but from a point about Whirlpool Rapids. He also condemned the opinion so generally held that the falls moved upward at a slow rate, by showing that between 1841 and 1886—45 years—the first and last surveys made, the Horseshoe Falls went back 455 feet, or at the rate of about nine feet a year. The doctor's address was received with much attention and favor, and he was urged to present his paper in fuller form to be embodied in the published transactions of the association.

STANDARD TIME has been so thoroughly introduced in this country and the benefits of uniformity in this respect are so much appreciated now that it seems strange that other countries delay to adopt a similar system. In France, Paris time is supposed to be kept on all the railways, but as a matter of fact, it is said that each company sets its clocks according to its own standard, while different localities still keep up the absurd idea of "local time," which in fact still prevails in some conservative places in this country. An effort is being made in France to bring about the adoption of uniform standard time, which would not seem difficult to accomplish in a country so small compared with our vast continent.

SUBMARINE TELEPHONY.—The French have made experiments in submarine telephony at Brest. The instrument used is the invention of M. Barrat, who has called it the hydrophone, which, roughly speaking, is simply an ordinary microphone, arranged so as to equalize the water-pressure in both sides of the diaphragm. The experiments have, to a certain extent, been successful, as under the most favorable conditions the sounds produced by such instruments as bells, whistles and trumpets, were heard at a distance of 5700 yards.

USEFUL INFORMATION.

MAKE YOUR OWN ICE-CREAM.—Ice-cream is a luxury which is greatly appreciated during the warm months. An ice-cream freezer costs about two dollars and a half, and once that is bought, cream can be made at home at very little expense. The trouble of preparation is not nearly so great as is often supposed, and the result is so satisfactory that those who are fond of ice-cream are advised to try it. Besides the freezer a wooden mallet for pounding ice and a stout canvas bag to pound the ice in are indispensable. To make the cream, use one pint, good measure, of rich milk. Let this boil, then mix together two tablespoonfuls flour, one capital sugar and four or five eggs. Beat these very lightly and stir into the boiling milk. Cook 20 minutes and set away to cool. When ready to freeze, add one quart of cream, if you have it, or one pint of cream and one pint or quart of milk. Put this in the freezer. Pack the tub full of pounded ice and salt, using about 2½ pints of salt evenly distributed through the ice. Turn the handle of the freezer slowly at first, and very rapidly for the last few minutes. In about 20 minutes you will have a nice ice-cream. Take out the heater, put on the cover, being careful to put a cork in the place where the heater goes through. Put a blanket or piece of old carpet over it, and by putting the freezer in a cool, dark place it will keep several hours without any more ice. A great many persons spoil ice-cream by fussing with it. If it is let alone it will keep all right if the above directions are carried out.—*Ex.*

ARTIFICIAL SILK.—There seems to be a possibility that an artificial substitute may be found for the product of the silkworm. A. Paterson, N. J., silk manufacturer recently said: "It is by no means impossible that artificial silk may some time replace the product of the silkworm's labor. That, of course, is only a possibility and not a probability, but it is very probable that artificial methods will replace the tedious and expensive means now employed to utilize the worms. It has for some time been known that worn-out silken fabrics can be utilized by putting them in a chemical bath which separates foreign substances from the silk itself, and saves the latter in a solution. This solution can be respun or need to plate other thread. Now, as I learn from France, Dr. Chardome of that country has succeeded in making a purely artificial silk. He makes a solution of nitro-cellulose, alcohol, ether, ferrous chloride and tannic acid, in nicely calculated proportions, and runs it from a reservoir through an exceedingly minute hole into a bath of water, acidulated with one-half of one per cent of mono-hydrated nitric acid. The fluid hardens in the water, and is dried in hot air. It is said that the thread can be readily dried, but I do not know what other valuable qualities it has."

AN ELECTRIC CARRIAGE for common roads has been patented in England. A pictorial representation of the device, which is given in the English papers, shows a common wagon or carriage body on springs. In appearance the vehicle does not differ much from an ordinary four-wheeled vehicle with the shafts removed. The motor is placed in the center of the body of the vehicle. Motion is communicated to one of the hind wheels by means of a small pinion on the main shaft of the motor working into a pitch chain, which passes over a series of L-shaped plates attached at intervals to the inner face of the wheel, so as to constitute in effect a driving pulley for the pitched chain to act upon. The motor can be reversed so as to back the vehicle. The power is stored in 24 small accumulators of special type, occupying the space under the seats, and said to be sufficient to propel the vehicle at a speed of about ten miles per hour for five hours. The steering is effected by a shaft projecting through the foot-board and operated with a hand-wheel. A brake is also attached, worked with a lever.

PAPIER MACHE COVERING FOR PULLEYS.—An ingenious method has been patented in Nottinghamshire, England, which consists of a papier-mache covering applied to pulleys in any ordinary driving by means of a chemically prepared cement. So firmly does this covering adhere to the face of the pulley, that after being in use a few hours it becomes an inseparable part of the pulley. An advantage is that this covering can be fixed on pulleys in use, without disturbing any part of the fittings or causing any loss of time by the machine being idle. It only requires 10 hours to set, and no riveting is needed. What is claimed for the covering is that a machine will produce more work, the belts will last longer, as they are not subjected to so much strain caused through enacting, dust, oil and steam having no effect on its gripping power, and it saves loss of power, as it prevents all helts from slipping.

HOW GLASS LAMP CHIMNEYS WERE INVENTED.—Why is it that the glass chimney makes such a difference to the light given by a lamp? Because it increases the supply of oxygen to the flame by producing a draught, and concentrates and reflects the heat of the flame, in consequence of which the combustion of the carbon is more perfect and very little escapes unconsumed. Lamp glasses were invented by Aime Argand, the inventor of the famous lamp which bears his name. He had

been experimenting for some time to increase the light, but to no purpose. On the table before him lay this broken neck of an oil flask. This he took up carelessly, and placed it almost without thought over the wick. A brilliant flame rewarded this act, and the hint was not lost upon the experimentalist, who proceeded to put his discovery into practical operation at once.

TO POLISH TINWARE.—For general use an old cloth will do, or rub the article over oil, then sprinkle on whiting, and then polish with a cloth. If the article to be polished is round, and it is desired to have it look like lead, then rub up and down; if it is wanted to look like silver, then rub around the article. Fancy spots can be put on tin by covering the thumb with the polishing cloth, and then give the thumb a circular motion on the tin. The result is difficult to describe, but it is very effective. The manufacturers of brass (musical) instruments use Venetian lime for polishing, but for the requirements of the tinner, whiting, when properly applied, should answer all reasonable purposes.

SHARPENING TOOLS.—It has often been said, of late, that glycerine is much better than oil for sharpening tools; but the fact that it should be mixed with a small quantity of oil is not as often heard of. The proportions of the composition should be made according to the class of tools to be sharpened. One with a relatively large surface is best sharpened with a clear fluid, three parts of glycerine being mixed with one part of spirits. A graver, having a small cutting surface, only requires a small pressure on the stone; in such cases, mix the glycerine with only two or three drops of spirits.—*Ex.*

HEBREW MANUFACTURERS.—The *Jewish Gazette* of New York says: In the clothing trade there are 241 manufacturers in this city, of whom 231 are Hebrew firms. Over 600,000,000 cigars per annum are manufactured in New York by Hebrew firms, employing over 8000 hands, and whose yearly transactions reach \$15,000,000.

FOR REMOVING OLD VARNISH.—A mixture for the removal of old varnish has been patented in Germany by a Mr. Meyer. It is obtained by mixing five parts of 36 per cent silicate of potash, one of 40 per cent soda lye, and one of sal-ammoniac (hydro-chlorate of ammonia).

A NEW STEAM STREET CAR.—In the trial of a new steam street-car in Sweden, the cost of fuel is said to have been only about two cents per mile. The car will seat 24 passengers, the engine being in one end of the car.

GOOD HEALTH.

YELLOW FEVER.—GETTING CONTROL OVER IT. All scientific medical men agree that no reasonably sure cure for yellow fever has yet been discovered. This fact is what causes the scourge to be regarded with such popular terror. Still, the record of the ravages of the plague in Jacksonville, Florida, this season shows that medical science has done much to lessen the mortality among patients. The deaths in nearly 4000 cases are only about nine per cent of the whole number, showing that with reasonable care and skilled medical treatment, the average patient has nine chances in ten of recovering. In former years, the mortality was proportionately much larger, in some visitations of the disease the deaths being fully 25 per cent of the number of those taken down. Considerable comfort may be derived from these facts, for they go to prove that in a measure yellow fever is succumbing to enlightened scientific treatment. Some idea may be derived from a comparative study of the death-roll among the smallpox patients during the prevalence of that disease in this city last winter, and the deaths in Jacksonville. The smallpox patients in San Francisco numbered just about one-tenth of the yellow-fever patients in Jacksonville, Florida, and the death rate was about nine per cent, showing that the smallpox here was proportionately as fatal as is the yellow fever in Florida.

TOUGH FRUIT SKINS.—The skin of plums is wonderfully strong compared with its thickness, and resists the action of water and many solvents in a remarkable manner. If not thoroughly masticated before taking into the stomach, this skin is rarely, if ever, dissolved by the gastric juice. In some cases pieces of it adhere to the coats of the stomach as wet paper clings to bodies causing more or less disturbance or inconvenience. Raisins and dried currants are particularly troublesome in this way, and if not chopped up before cooking, should be thoroughly chewed before swallowing. If a dried currant passes into the stomach whole, it is never digested at all.—*Popular Science Monthly.*

EARS INJURED BY SEA-BATHING.—The past week my office has been filled with seaside victims, many of them being children (said an aurist yesterday). People who have the "nummering away from home" on the brain take their little ones with them, and if the sea coast is sought the poor child victims, especially girls, are forced against their will into the water to fight the breakers for the benefits accruing from the fashionable sea-baths. Little girls have a natural aversion to entering the

sea. They are fearful of the waves, and it is highly injurious to their nervous system to force them to it. But the reason they are brought to me now for treatment is the injury done to their ears and hearing from not only the shock of the roaring noise affecting the acoustic parts, but the salt water having entered and filled the ears, and seriously injured the drums, in many cases producing inflammatory symptoms. Of course, often we can cure them in a short time, but again permanent ill is accomplished. In any event the sufferers, either temporarily or permanently injured, must endure a great deal, not only pain, but the incessant roar in the ears, which resembles in effect a too great quantity of quinine taken into the system. If parents will bring their children with them to the seaside, they must either watch them very closely while sea-bathing or prepare themselves for the dangers to the health that must follow.—*St. Louis Globe-Democrat.*

THE BEST WAY TO OBTAIN REST.—"In the progressive tendencies of the American people," said a physician to a reporter, "the subject of proper rest plays a very small part. The idea seems to prevail among them that this matter is subservient to all else—that it may be taken at any time and in almost any manner, provided there is nothing more important to do. Only this morning a lady consulted me in regard to her health, complaining of a tired feeling, being scarcely able to attend to her duties, and all that. I diagnosed the case, but could discover no symptom of disease. She was simply suffering from want of proper rest. I told her what troubled her, and no doubt she went away convinced that I did not understand her case. A man or woman, particularly the latter, will become tired, and being firmly convinced that everything will go wrong if she stops work, busies herself with some other occupation, or, if exhausted, will throw herself in a chair or upon a lounge with a book or paper and try to restore strength in that way. This is not rest. It only creates a longing for it. The true way is to lie at full length upon a mattress, or any equally hard surface, using no pillow, with arms extended and eyes closed. Dismiss for the time all care and seek only rest. This will bring to an exhausted body the refreshment and contentment which no amount of medical advice or skill can predetermine."—*N. Y. Mail and Express.*

AN INTERESTING QUESTION.—William McNamee, in an article which lately appeared in the *St. Louis Globe-Democrat*, says: I have noticed that there is a difference in the hearing of people in general in the different seasons of the year. There are men who walk erectly and who hold their heads high in the winter. Take these same men in the summer, and there is a very perceptible droop to their shoulders and an inclination of the head forward. In the winter this defect in their carriage will have been remedied and they will walk as straight as ever. I have studied the matter with much interest, but whether it is due to a general loss of stamina from the system by reason of the heat, or whether it is a natural instinct of the man to protect himself, his face and eyes, by leaning forward, I have not determined. It may be due to both causes, or may not be caused at all. At the least it is an interesting question.

ANOTHER ALLEGED CURE FOR WHOOPING COUGH.—Dr. Mohn, according to the *Revue Mensuelle des Maladies de l'Enfance*, May, 1888, claims that he has in a number of cases produced instant and permanent cure of whooping cough by fumigations with sulphur. His method of procedure is as follows: In the morning the children are clothed and removed from their sleeping-room, in which are hung all the clothing, toys, and, in fact, everything with which the children are brought in contact. In this room about four ounces of sulphur for every cubic yard of space is ignited, and the sulphurous acid allowed to remain in the room for about five hours. The room is then well aired, and the next evening the child sleeps in a room and bed which has been completely disinfected, and it is said that cure is at once produced. As to whether this will be attained in all cases, we do not presume to state.

FOR THE FEET.—From Germany comes information for policemen, carriers, collectors and others who are on their feet a great deal. Chafed, sore, or blistered feet may be cured by the use of a powder which is a necessary part of a German army equipment. It is known there as "Feustrenpulver," and consists of three parts salicylic acid, ten parts starch, and 87 parts pulverized soapstone. It keeps the feet dry, quickly heals sore spots, and prevents chafing. A powder of pulverized soapstone is also good.

WALKING UP STAIRS.—An Albany physician once gave a lady patient the prescription: "Stop walking up and down stairs." The only way the prescription could be taken was to vacate the three-story and basement house in which she lived. Her husband owned a roomy cottage of two stories, and within a year the invalid's health was almost completely restored.

MOST PEOPLE regard an elevator as more liable to cause accidents than a flight of stairs; yet during the year, 18 Boston people died from falling downstairs, while but ten were killed from elevator accidents.

ENGINEERING NOTES.

The Rival Isthmus Canals.

Our frequent references to the Panama canal afford very good evidence that the scheme is one of exceedingly doubtful consummation. However competent and honest M. De Lesseps may be, and we think no one questions him in either respect, it is a matter most apparent that the whole working portion of the enterprise has been an engineering blunder from the start, and that it has been conducted in a manner totally regardless of economy. It is perhaps quite safe to say that one-half of the \$150,000,000 expended has been fairly thrown away. It is this feature of the enterprise that is now keeping capitalists away from it. Even those who have already largely invested and have abundant means to continue such investments are holding back, preferring to lose what they have paid in rather than take the risk of further investment in such a badly managed scheme. The *Economiste Francaise*, the leading financial journal of France, says the enterprise is on its "last legs."

The *Engineering and Mining Journal* of New York says of the several recent manifestoes of M. De Lesseps: "It is lamentable to read such bombast uttered by a man who has so justly and gloriously distinguished himself as an engineer, and although it may be only a French method of reassuring frightened shareholders, it seems to us like a deliberate perversion of the truth. There is not the least probability nor even possibility of the Panama canal being completed by De Lesseps or by any one else at a cost, including past expenditures, that could possibly make a remunerative investment. It is becoming evident to every one, except De Lesseps, that every franc expended up to this time will be absolutely lost to the investors."

Meanwhile the work of the Nicaragua canal goes on in a quiet and more business-like fashion, and on the 9th inst. the contract negotiated at Washington, between the Special Envoy of Costa Rica and the President of the Nicaragua Canal Association, was ratified by the Congress of Costa Rica, and signed by the President of that republic. This scheme is not nearly so pretentious as that of Panama, and if executed in an economical and business-like manner will possibly pay a moderate return on the investment, which will be but a small part of that at Panama, while it would 'divide the business' with that canal were it ever completed, and thus halve the receipts, which, taken altogether, even the exuberant imagination of De Lesseps is unable to show, would pay interest on the Panama investment."

The *London Financial Times*, in comparing the two enterprises, says: "If the (Nicaragua) canal is completed at anything like the estimated expenditure, there appears no manner of doubt that it will prove a gigantic financial success. Overloaded with the burden of an enormous capital, the Panama canal is likely to prove but a poor rival."

The same paper expresses the opinion that "32,000,000 tons of English shipping would find its way yearly through the Nicaragua in preference to the Panama canal in addition to the huge commerce of the United States." It further says: "But incalculable as the advantages would be to England, it is probable that the United States would benefit to a still greater extent. * * * It is very probable that the British public will have an opportunity of investing in the canal, as we hear an English syndicate has already agreed to purchase a part of the stock."

THE HUDSON RIVER TUNNEL.—This tunnel under the Hudson river, which was started several years ago by several California capitalists, seems to have recently passed largely under English control, and its new projectors are working hard to get their bonds on the home market, and are paying for column advertisements in the London papers calling attention to the desirability of the investment. Just now the issue on sale is termed a first mortgage, five per cent gold security, and amounts to but \$1,500,000. Payment is to be made in installments up to January 1st next, at the rate of £180 for \$1000. Interest is guaranteed up to January 1, 1893. It is incidentally mentioned that \$8,500,000 more of the first mortgage bonds are to be issued upon the tunnel before its completion. The advertisements state that the charge for passenger traffic through the tunnel will be five cents per head, and estimating on a basis of 30 per cent of the passengers and five per cent of the freight now crossing the North river as the business of the tunnel, its projectors figure out a net profit of more than three times the amount required to pay the interest on the whole \$10,000,000 of bonds proposed to be issued. The permanent terminus of the tunnel, it is stated, will be at Broadway, 16 feet below the surface, on the New York side, and at Fifteenth street, Jersey City. It is proposed, however, to begin carrying passengers as soon as the part of the tunnel under the river is completed, using temporary terminals until the permanent ones are ready.

THE EADS TEHUANTEPEC SHIP RAILWAY contract has been given to the Atlantic & Pacific Railway Company, the work to be completed in five years. The Mexican Government has made liberal concessions, and this road is thought likely to be in operation before the De Lesseps or Nicaragua canal can be completed.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

AMADOR.

AMADOR GOLD MINE.—*Ledger*, Oct. 20: At the Amador mill the retaining wall is finished. All the battery blocks are in position and well tamped. The battery blocks are of fine sugar-pine, selected with care. J. B. White & Co. are ready to commence erecting the framework of the mill, and will start at it to-day. They have the work well in hand and will make good progress from now on. They say they will make it one of the best mills in the State. At the mine considerable work is going on. The mine is fast getting into shape to supply ore to the mill. A new blacksmith shop is going up. It will be fitted with conveniences for making cars, skips, and doing other mine work. The automatic shut-off, made by Knight & Co., attached to the compressor pipe, does good work and is an excellent arrangement for saving water-power. Two machine drills are kept steadily at work. Another drill will be started Monday. Last pay-day this company paid out \$11,000 besides payment on mill.

SUTTER CREEK.—S. D. R. Stewart is having a six-stamp mill built—two batteries of three stamps each—to place on the Leggett & Manditch claim that he has recently purchased, about five miles east of here. He intends to get the mill running as soon as possible.

Fresno.

A RICH PLACER CLAIM.—*Fresno Republican*, Oct. 20: About the 8th of September William A. Bell located a placer claim on King's river, about three miles below Trimmer's Springs, in the Sacramento district, some 40 miles east of this city. He has since that time prospected the claim thoroughly, taking out of the prospect holes \$20 worth of very beautiful coarse gold. The claim is on the north side of the river and comprises a small flat of about 30 acres. Water can be brought upon it from the river, and as there is a good deposit of yellow clay on top of the bedrock, the whole claim can be ground-sluiced successfully. One chunk of pure gold shown weighed about \$5, and everything goes to show that the claim will prove one of the richest ever worked in Fresno county. Mr. Bell has sold a half-interest in the claim to E. S. R. Mainwaring, and they started yesterday from this city, fully equipped to commence active operations on their property. The flat was located years ago by Chinese, but as there was a bitter antipathy against letting those people get a foothold on Kings river, they were not permitted to work the claim. Upper Kings river has been only meagerly prospected up to the present time, although considerable placer mining has been carried on at different points along the stream for 20 years past. We believe that this new location will have the effect of stimulating other prospectors to seek good finds, and if they look for them persistently there is every reason to believe that their efforts will be crowned with success.

ASBESTOS.—A. L. Bartlett of Pine Flat has discovered on the north side of King's river, about 35 miles from the City of Fresno, a ledge of asbestos, about 18 inches in thickness. The find is pronounced by experts to be of the best quality and worth about \$35 a ton.

Inyo.

PANAMINT.—*Inyo Independent*, Oct. 23: At Panamint 20 men are at work. Nearly all are prospecting claims on their own account. It is said that everybody is getting out ore and making fair wages. A run has been finished at the mill, but the result has not been reported. It is believed, however, that the returns will be very satisfactory.

AT LOOKOUT Frank Fitzgerald is doing very well. He is getting out a good deal of ore, nearly all of which is rich enough to ship. He is also concentrating tailings and flue dust at the rate of ten tons per day; this is concentrated to four tons and shipped. It pays well.

DARWIN.—The Defiance mine, at Darwin, continues to look very well. A ledge is now opened that runs about four feet wide, and more than half of this is pure galena ore. For the first time in the history of the mine native silver is now found in the ledge. Ore shipments are now made regularly.

CERRO GORDO.—More silver ore is being shipped from Cerro Gordo than from all the other camps in the county combined.

FINDS.—Some very promising ore finds have been made during the past ten days in the Inyo mountains, east from Independence. A wood-chopper discovered a ledge, the outlook of which is very favorable. Some days later J. W. P. Laird, Register of the Land Office, made a trip to the same locality accompanied by Sam Gruber, an old prospector. They brought in some very rich looking silver ore. Mr. A. Davidson has found some still richer specimens in the same region. In all of these cases there are good indications of the ore bodies being of considerable extent. It has always been held by mining men that the Inyo range to that locality only needed prospecting to develop a very rich mineral region.

CERRO GORDO.—*Register*, Oct. 16: The outlook for a revival in mining at this camp, says a correspondent, is better than it has been for nine years, or since the Union Con. shut down. Negotiations are pending whereby an Eastern and London Co. will mine some of the best properties on an extensive scale.

A NEW STRIKE.—*Inyo Index*, Oct. 20: W. H. Russell, superintendent of the Lone Pine Mining Co., was in town on Monday last. He informs us that a two-foot vein of fine-looking ore has just been found in the San Carlos mine near Independence depot. The value of the ore has not been ascertained, but its appearance is quite promising.

Los Angeles.

CORA BELLE.—*Newhall Times*, Oct. 20: Surveyor Gavin is at the Cora Belle working on the new hydraulic system. A mammoth reservoir is to be constructed and water piped on to the mineral ground, and the claim will be sluiced out. Great returns are expected, for the mine is wonderfully rich. The El Dorado mine in the San Francisco canyon now assays \$44 in silver, with good tracing of copper. A shaft will be sunk into the ledge and

better ore is expected. This is owned by McDuffee, Smith & Kichline. The American Eagle, about four miles above the El Dorado, goes \$23 in silver on the outcroppings. The Shkel mine is a little farther up and assays \$7 to \$77 in gold and about \$2 in silver. The ledge is about 40 feet thick, of white quartz, and is alongside the main road to Elizabeth lake. The gold is very fine, minting from \$19.50 to \$20 per ton. The Central Confidence and Conclusion are in the vicinity and are of about the same grade as the Shkel. They are all owned by Richard Kichline. Rudd & Heilig expect to get their dry-washers up and working to-day. They will mine on the Smith claim in Placeritas canyon first, and then will work on a royalty or lease all the land they can get. The firm put great confidence in their washer.

FINE GRAPHITE.—*Los Angeles Herald*, Oct. 20: There is on the writer's desk in the *Herald* office a piece of as fine graphite as there ever was taken from the ground perhaps so near the surface as this comes from. An assayer of this city finds that it contains 82½ per cent of pure graphite, and the rest is "grit," probably lime. This mineral comes from the mountains near Newhall in the San Francisco canyon, Los Angeles county. It lies 18 miles distant from the Southern Pacific track. The ledge is owned by Messrs. Liddell, Hoy and Lane, who have a prospective fortune in their find.

Mariposa.

BONDED.—*Mariposa News*, Oct. 20: Judge Walker has bonded the Grove & Ellingham mine, at Whitlocks, and will commence to develop it at once; he will also commence cleaning out the tunnel of the Whitlocks mine.

BEAR VALLEY.—Work on the Pine Tree still continues. On Monday the tunnel had been run 94 feet on the vein. The ledge will average 6 feet of milling ore that will go \$3 to the ton. The ore in the face of the drift at last accounts was good for \$20 to the ton.

AT WHITLOCK.—*Mariposa Gazette*, Oct. 20: Good news reached us that Judge Walker is preparing to commence work opening the Whitlock mine as soon as conveniences can be provided for his employees upon the surface. The mine is an old one which was worked from 30 to 40 years ago. The old shaft tunnels and drifts are all more or less caved in and filled up, which will, no doubt, cause considerable deadwork before the main body of ore can be reached. The last work done upon the mine of any importance, as well as we can recollect, was by the Marshalls about 20 years ago. Capt. Diltz, who still lives, knows the character of the Whitlock mine and the Spencer vein, which is a part of the same property, better than any man living. The captain frequently alludes to his early workings and that in one run of 100 tons they took out \$10,000. He still holds to the opinion that it is one of the best mines in the county. The only trouble and drawback to this as well as other mines in the same vicinity is the need of fuel and want of water. Still other mines in the same vicinity are opening up and developing good ore, which the parties at this time are grinding on a small steam-mill. Mr. Ellingham and Johnnie Grove are the owners of the mill. Another mining company, the Helm Bros., are close by extracting rock from a vein of quartz rock which they have clung to for several years.

Monterey.

LOS BURROS DISTRICT.—*Cor. Monterey Democrat*, Oct. 16: In the Cruikshank tunnel it is reported that they have struck some small stringers of rich quartz, but the main vein is supposed to lie quite a distance farther ahead yet, but as the ground is softer and driving ahead is easier, they will know now in a week or two whether we have a fall boom or not. The King tunnel is in very favorable ground for ore. They have struck blue slate with quite a stream of water flowing from the face—a sign that the vein is not far off. The Ajax mine is idle just at present. To-day one of the owners took several samples of ore from the vein in the northeast crosscut, which, out of six samples mortared up, five prospected fine, showing quite a lot of gold. The crosscut is about 150 feet from the mouth of the tunnel and 50 feet from the face of the tunnel. The annual assessment work is being done on several of the most prominent locations—the Aina, Mammoth, Manzanita and others. Jones & Flood have found good prospects on the Plum Knight. On the Manzanita they have sunk an incline down about 15 feet and have a well-defined ledge of over 2 feet of fine quartz which prospects high.

Naba.

SILVER.—*Calistogan*, Oct. 17: R. F. Grigsby of the Palisade Mining Co., near Calistoga, received a diploma at the Napa fair for an exhibit of mineral ores and a silver bar. The specimens were rich and attracted a great deal of attention. The silver bar, or brick, was the most striking proof of what is being done in the mines near Calistoga. The bar was of the size of those now shipped from the Palisade mines to San Francisco, and its value was nearly \$2000 in silver and gold. It occupied a prominent point in the pavilion. It represented the beginning of an industry here that before long will be of great value to the county.

Nevada.

DEVELOPING WELL.—*Nevada Herald*, Oct. 20: The Washington mine situated on the Bloomfield grade above Edwards' bridge, which was located about a year ago by J. R. Tilton and his son George, is said to be developing well. When the locators first went to work there everybody thought they were on a wild-goose project and the matter was referred to in a jocular manner. They have stuck to it, though, through many discouragements, and it looks now as if they might be rewarded for their perseverance. They have interested outside capital in their project, and some rock has been taken out which is reported as having yielded good returns from milling. R. F. Pixley is here representing the capitalists and has several men at work. Henry Richards was engaged to-day to go out and act as foreman. From a blast that was set off yesterday some good-looking rock was obtained. A tunnel is to be run into the mountain-side at a level considerably lower than where work has hitherto been done to determine the extent of the prospect.

SPENCEVILLE COPPER MINE.—*Herald*, Oct. 16: Last spring Messrs. Chas. Pietzsch and O. Wochler purchased the property of the San Francisco Copper Mining Co. at Spenceville, paying therefor the sum of \$9500. Since the purchase they have been

engaged in leaching over the old ore-piles and are extracting about 10 tons of copper per month, which is 80 per cent fine, and which brings, in that state, \$225 per ton, or, if smelted and made pure, it sells for \$320 per ton. Of pure bar copper the yield is about eight tons per month. There are immense piles of this old ore which was extracted by the San Francisco Co., and which will take quite a long time to work over.

THE OMAHA AND LONE JACK.—*Tidings*, Oct. 22: To-morrow the new eight stamps at the mill of the Omaha and Lone Jack Consolidated will begin to drop and to pound out gold from quartz. A Pelton wheel replaces the bulky wooden overshot which formerly drove the original ten stamps, and other improvements have been made. Supt. Mainhart reports the outlook at the mine to be very favorable. He expects to keep busy night and day, the mill's full complement of 18 stamps on ore of good quality. All underground operations are conducted through the Omaha shaft. This property is also one that yielded largely in bygone days and was subsequently abandoned as worked out. It is quite likely that dividends are yet in store.

MILL COMPLETED.—*Transcript*, Oct. 23: The Bryan roller-mill at the Erie mine has been completed and everything is in readiness to commence crushing. The mill contains three rollers, each of which weighs 3600 pounds, and is shod with a steel tire six inches wide. The crushing is done by the attrition of these rollers in passing over the quartz, and it is claimed that this mill will reduce to powder 40 tons of quartz each 24 hours, and that it will crush 18,000 tons before any repairs are needed.

Placer.

FOREST HILL.—*Placer Argus*, Oct. 20: The gravel mines in the vicinity of Forest Hill are showing up well and those who are in a position to know claim that the palmy days of the past will be re-enacted, and that the mining industry will be revived. There is unquestionably good territory in that section, and all that is required is capital to develop it. The Valentine Bros., who recently purchased the Hathaway mining property will soon erect a mill and commence work in earnest. This property is well developed, and under good management will become a heavy bullion-producer.

IOWA HILL.—*Cor. Placer Republican*, Oct. 19: At the Pioneer quartz ledge the tramway is completed to the mill-site, and the machinery for the mill is on the ground ready to be put in position. The indications in the Blue Wing drift are good. A four-ounce specimen was found there last week. The Watts Bros. took out 75 ounces in their mine at Monona Flat during the last six days.

San Diego.

TEST OF ORE.—*National City Register*, Oct. 16: Superintendent Chick of the reduction works has been very busy during the past week making mill tests of ores sent from Arizona and the country immediately surrounding us. A surprising result was obtained from a piece of rock about a foot square, taken from a ledge not 30 miles from National. A trifle over \$100 in gold was taken from it. Three tests were made from Arizona ore the other day that caused Supt. Chick to open his eyes in great surprise. The first lot milled \$80, the second, \$180, and the third brought forth the astounding lump of \$9500 to the ton. This ore will be sent here as soon as the works are ready for business. Mr. Chick shows the bullion, but refuses to state to whom it belongs.

Siskiyou.

RIVER MINING.—*Yreka Journal*, Oct. 20: The Centennial Co. has pulled out its machinery from the Klamath river, having worked out their last cut, as it is too late in the season to remove to a new cut before the winter rains commence. All the other companies in the Honolulu district of the Klamath river are still working their claims constantly, day and night, with expectation of continuing operations energetically until the winter freshets force them to pull out.

Tuolumne.

ALONG THE EUREKA LODGE.—*Tuolumne Independent*, Oct. 13: The Eureka Consolidated at Summerville is giving a boom to the camp, with every indication of being a permanent thing. The mine is one of the largest gold-bearing lodes in the county. It is at present the only one being worked of the several mines that stand on a celebrated line of gold-producing rock, which was the pride of Tuolumne in the days of a bright and happy past. Below are given a few notes on the string of extensions, some of which set the public pulse throbbing with excitement 25 or 30 years ago: Commencing on the south end and running north, the first on the list is the Consuelo, the property of D. B. Warfield of Oakdale. The mine stands 1000 feet up the steep hillside above the Tuolumne river. In the early '60s this was classed as the mine of mines, in what was known as the McCarthy shaft the miners taking out a six-foot ledge that milled \$800 per ton. Work was suspended on the property in '66. The Bonita, the next on the line, was never worked to such a great extent as some of the others, but was considered a fine claim in its day. The mine is now in the possession of Williams & Guion, the steamship firm of New York. In 1859, Messrs. Soulsby, Bradbury, Johnson and "Big" Benjamin opened up a prospect, afterward famous as the Grizzly. Miners of experience claim that the mine was never half worked and that plenty of first-class rock is to be found in it now. It is now the property of Wm. Sharwood of Soulsbyville. The next is a mine owned by the Richards Bros. of Sonora, and which has been the property of the family for the past 25 years. It might be termed merely a prospect, as comparatively little work has been done. Rock that paid well has been taken out, but the vein was broken up and cut by a lime reef. The claim adjoining the Richards is the Lady Washington, located in 1858, and now controlled by Mrs. E. Dorsey of this place. It was called a good one in its day, and a good chute is said to have been left. The Eureka Con. is a consolidation of the Dead Horse and Eureka, discovered in '59 or '58 by Messrs. Inch, Edwards and the Blakeleys. The mine has been a famous one, and, from present indications, is likely to out-hine its former glory. Improvements are constantly going on, a large force of men is employed and the 20 stamps of the new mill hammer merrily away on paying quartz, of which it has enough in sight to keep them busy day and night for the next 10 years. The mine is owned by Hayward, Hobart & Co. With the exception of the property mentioned, all these

mines have been lying idle a number of years. Nearly all these mines have had in connection valuable plants, including mills, hoisting works, boarding-houses, etc., but the late fire in that district swept everything away. Now nothing is left but the developed ledges; these vary from 3 to 25 feet in width, average about five feet, and will mill \$6 per ton for every ounce of rock between the Consuelo and the Eureka.

NEVADA.

Washoe District.

CON. CAL. AND VIRGINIA.—*Enterprise*, Oct. 20: From the stopes on the 1400 and 1435 levels the usual quantity and quality of ore has been extracted. On the 1500 level are stoping ore from the parallel north drift, 60 feet north from the upraise above that drift. Continue to stop ore from the southeast drift run from that upraise, 58 feet above the track floor of this level. On the 1600 level are stoping ore from two points. On the 1650 level are stoping ore of good quality from the east drift, run from the upraise carried up above the south drift from the east drift from the Con. Va. shaft, 86 feet above the track floor of this level. The winze going down from the end of the south drift is sunk 36 feet below this level. It is still in quartz showing some value. The usual amount of ore is being shipped to the mills on the river and in this city. The battery samples will be about the same as last week.

SAVAGE.—Since last report the southeast drift, 400 level, has been advanced 42 feet. Have resumed the extraction of ore from the north and south drifts on this level. On the 500 level west crosscut No. 1 has been advanced 51 feet. The joint east crosscut on the south boundary on this level has been advanced 53 feet. The last 8 feet of the drift is in good ore, car samples averaging \$50 a ton. Have started another crosscut at a point 70 feet north of the joint crosscut to intersect the northward continuation of the ore body found on the line. On the 950 level No. 1 east crosscut has been extended 38 feet. From the several levels are extracting about 50 tons a day, which is being shipped to the Rock Point mill.

POTOSH.—The south drift on the 650 level has been advanced 26 feet; total length, 486 feet. The face is in quartz and porphyry. East drift No. 2, 300 feet south of the north line, 650 level, has been advanced 13 feet; total length, 27 feet. The face is in low-grade quartz. The west drift from the 750 station of the Chollar and Potosi shaft has been advanced 24 feet; total length, 133 feet.

CHOLLAR.—East drift No. 2, 300 feet north of the south line on the 650 level, has been advanced 27 feet; total length, 51 feet. This drift is passing through quartz and bunches of ore. West drift No. 3, 300 feet north of the south line, 650-foot level, has been advanced 14 feet; total length 32 feet. The face is in clay.

CROWN POINT.—The main drift on the 700 level is out 90 feet beyond the west crosscut. A distance of 26 feet has been made during the week. The face is in a mixture of quartz, clay and porphyry. The connection with the Sutro tunnel is on the point of being made.

HALE AND NORCROSS.—Since last report the west drift on the 500 level has been advanced 52 feet. The joint east crosscut on the north boundary has been advanced 53 feet. The last 8 feet of the drift is in good ore. Car samples average \$50 a ton.

BELCHER.—On the 200 level the north drift from the shaft is out 46 feet. It is in a promising formation of soft porphyry. The 850 station is being repaired and repairs are being made to chutes. This work is about completed.

EXCHAMBER.—The northeast crosscut on the 382 level is out 172 feet. The face is in porphyry. The north central drift on the same level is in north from the Alpha shaft 434 feet. This drift is skirting along a heavy clay.

UTAH.—On the 472 level, in the north lateral drift, 73 feet north of east crosscut No. 1, east crosscut No. 2, has been extended 52 feet; total length, 132 feet. The formation is porphyry, clay and quartz.

ALTA.—Repairs to machinery and works completed; also to main shaft. One or two drifts are now being repaired. Are ready to resume work whenever orders to do so are received from below.

ALPHA.—The north lateral drift on the 500 level is in from the shaft 94 feet. The face is in quartz. The south lateral drift on the 500 level is in 23 feet. It is all the way in quartz, but of low grade.

KEYSTONE.—Work on the new mill is being rushed as rapidly as possible. A large amount of ore is on the dump ready for milling, and much good ore has been opened up in the mine.

BEST AND BELCHER.—The sinking of the winze below the 300 level in the new west ore body has been resumed, and it is said that the deposit improves as it is followed downward.

GOULD AND CURRY.—There are good bodies of ore opened out on the 200 and 400 levels, and the exploring drifts are passing through ground of a promising appearance.

YELLOW JACKET.—A good deal of repair work of various kinds is in progress. The mine will resume operations in excellent shape, both on the surface and under ground.

UNION CON. AND MEXICAN.—The main drift on the 1465 level is being advanced in Mexican ground. The material remains the same.

OCCIDENTAL.—Extracted 143 tons of ore and shipped to the Atlanta mill 150 tons; average assay value of wagon samples, \$28.

SEG. BELCHER.—Work in the upraise is making the usual progress. The formation is of a favorable character.

SIERRA NEVADA.—West crosscut No. 2 on the 520 level is still in quartz and porphyry giving low assays.

LADY WASHINGTON.—Work in the raise above the 725 level is being pushed ahead as usual.

SCORPION.—Since last report the west crosscut, 300 level, has been advanced 38 feet.

BULLION.—The usual work is in progress on the 500 and 600 levels.

BALTIMORE.—Prospecting operations are still vigorously prosecuted on the 338 level in ground of

a very promising character. A considerable amount of ore is being accumulated, which will presently be worked at the company's 10-stamp mill situated at the mine.

OVERMAN.—Explorations below the tunnel level are continued.

CONFIDENCE.—Are ready to resume operations in good shape.

OPHIR.—The south drift on the 1465 level is still in porphyry.

ANDERS.—Are still doing some repair work.

Silver Peak District.

RAILROAD AND WATER.—Inyo Independent, Oct. 20: There is likely to be a big mining excitement over Silver Peak. The locality is Nevada, east from Big Pine. A survey is now being made for a railroad from Silver Peak to the ranch of John Chistovich, a distance of 24 miles. There is an abundant supply of water at the Chistovich place, and it is proposed to build mills there. Another proposal is to convey the water in pipes to the mines instead of building a railroad. It is alleged that water pipes could be laid at a less expense than a railroad could be built, and once the pipes were laid there would be no cost for operating expenses as would be the case with a railroad.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Oct. 19: The crosscut from the north drift, 250-foot level, extended 12 feet; rock a little softer in the face.

GRAND PRIZE.—During the week water has been hoisted continually, and is now down a distance of 64½ feet below the 300-foot level station.

NORTH BELLE ISLE.—Have started front stop on the 400-foot level near the Queen line, which shows some very high-grade ore.

DEL MONTE AND NORTH COMMONWEALTH.—The Combination shaft has been sunk and timbered six feet. During the week some ore was encountered giving good assays.

NAVAJO.—The stopes on 350-foot level show some very high-grade ore. The stopes on the east vein from the intermediate level have yielded as usual.

FOUND TREASURE.—Some ore has been taken out and hoisted to the surface during the week.

NEVADA QUEEN.—The mill was stopped 24 hours to clean the boiler, otherwise has been running steadily and doing good work. Average assay from the battery pulp, \$185 per ton. Three hundred and fifty carloads concentrating ore have been hoisted; average assay \$22.20 per ton. Concentrating works are finished, all ready to start up. Work on the new mill is progressing nicely.

COMMONWEALTH.—100-foot level: West drift from main south drift has been extended 18 feet. The ore is two feet wide and good grade. No. 1 winze from east lateral drift has been sunk eight feet, following the ore which shows well. North drift from joint crosscut on south line has been extended 15 feet, opening up high grade. A drift has been started from top of No. 4 chute to open the ore north of the shaft, preparatory to stoping. This drift has been extended west 23 feet and east 10 feet. The ore extracted from the drift is very rich.

Wild Rose District.

PARADISE MINES.—*Silver State*, Oct. 17: The new hoisting works in the Wild Goose shaft, on the Paradise Valley Co.'s mines were started up last week, and at latest reports a body of fine ore was cut in the shaft.

ARIZONA.

AROUND PRESCOTT.—*Journal-Miner*, Oct. 17: Receipts of ore at the Prescott Sampling Works are on the increase. A deed from Frank Ryland to J. C. Rankin, for the Southern Belle mine, Tiger district, has been filed for record. Price, \$12,000. The new road to Copper Basin has been completed. One of the best evidences of the increased activity in the mines of this section is the fact that a mining superintendent has been trying for a week to engage five or six miners in Prescott, and has been unable to do so. J. J. Williams of Copper Basin accompanied Governor Tittle out to the Blue Dick mine a few days ago, and made a thorough examination of the property. They found very much larger bodies of low-grade ore than was anticipated, and it is thought that they can succeed in working them satisfactorily. Chas. A. Girdler returned to-day from a visit to the Amulet mine, on Lynx creek, owned by J. M. W. Moore. He reports very favorably on the property. He says there are over 2000 tons of second-quality ore on the dumps, which will go over \$20 per ton, the first-class ore being shipped to Denver. Mr. Moore contemplates the erection of machinery to treat his second-class ore at the mine. Messrs. Burrington & Harlan were in town today again with a bar of gold weighing 99 ounces, extracted from their Howard mine. Its total value was about \$700. This mine has produced a fabulous sum for the amount of work done on it. The deepest working is only about 60 feet, while over \$20,000 has been taken out, without any stoping having been done, except a few feet in connecting the tunnel with the shaft.

VARIOUS CAMPS.—Prescott *Journal-Miner*, Oct. 17: John Curtin and Nelson Gable have taken a lease on the Goodwin mine in Turkey creek. Chas. Thompson has sold one-fourth of the Mayflower and Copper Lion mining claims to H. S. Van Beuren for \$200. F. W. Mitchell came in last evening from the Clarence Ruby mine. Work has been temporarily suspended again on this property. Chas. H. Akers has leased the Trap Rock, formerly the Happy Jack mine, on Lynch creek, to Henry Goldwater and Frank Howard. The Boaz Co. at Minnehaha flat is pushing work on its mill, and expects to have it completed ready to drop stamps before the 1st of November. The Crowned King Co. has 150 tons of \$100 ore on their mill-dump, and will start up their mill again in a few days, having succeeded in obtaining a supply of water. Mr. Clark is very enthusiastic in his praise of the completeness of the Crowned King mine under the superintendence of N. C. Shekels. E. H. Witherell will put from 8 to 20 men at work on a mine in the Black Hills district, from which he recently had a sample lot of ore assayed, giving a good value. He estimates that he can furnish a carload of ore per week. Diamond Joe Reynolds has purchased the right for Yavapai county of Dr. Bellev's patent process of treating ores by means of electricity. It is claimed that re-

factory ores can be treated by this process for \$1 per ton, and it is thought that the Congress ore can be successfully worked by it. C. M. Clark from Bradshaw district reports the greatest activity in the mines there. He brought in some specimens of ore from Liston's mine, which are very rich, and he reports a large body of it in sight in the mine. The Oro Bello Co. has 60 men at work in the mines and building a road. The latter will be completed by the 25th inst. The mines continue to look far better than was ever expected, and Mr. Clark says they have a solid breast of ore in their tunnel, from two to four feet in width, which will go from \$80 to \$150 per ton. The Howard mine, which was considered at first as a mere pocket which would soon be worked out, is more worthy of favorable mention at present than at any time since its discovery. With their little two-stamp mill, and water source also, its owners are piling up a good, healthy bank account, while there are thousands of dollars in sight in the mine. Their latest cleanup was \$6834 from a run of five tons.

BRITISH COLUMBIA.

THE MCMURDO DISTRICT.—Donald Truth, Oct. 13: At least one mining district in the neighborhood of Donald has not had a backset during the prospecting season now about closed, and that one is the McMurdo. In August, its discoverer, Archie McMurdo, bonded two claims to John Hepburn, and that gentleman did enough work on them to satisfy him that he had got hold of good properties. During the same month, Lowe and Dainard, who had several locations in the district, succeeded through George McCabe in getting a Calgary Co. to take hold and develop the Monitor claim for a two-thirds interest in it. A tunnel was run in 82 feet to the ledge and two open cuts made. This work proved that the ledge carried four feet of solid ore, which assays as high as \$100 in silver and \$8 in gold to the ton, besides carrying a good percentage of lead. Some fine specimens also show gray copper. Near the Monitor is the Crescent ledge, on which seven locations have been made. The assessment work on the Crescent exposed a pay streak from four to six feet in width, and similar in character to that of the Monitor. This week all the parties interested came to Donald and bonded the Monitor, Crescent, and a claim called The Southern Cross to Mr. McCabe, the bond to run for a year. That gentleman expects to place them in the hands of American capitalists by spring, as he is well known among moneyed mining men in the Black Hills of Dakota and the Cœur d'Alene of Idaho. The indications are that the McMurdo district will make a good showing next season.

ANOTHER GOOD FIND REPORTED.—A month ago a new find was made about 40 miles below Revelstoke. The ledge is over 15 feet in width, and carries gold and silver in galena—assay returns give \$38 to \$80 in silver, \$2 to \$3 in gold to the ton, and 40 per cent lead. The camp is easily accessible, as the claim stakes are within a few feet of navigable water on the northeast arm of Upper Arrow Lake. The owners, Messrs. Walker, Hill, Graham, McDonald, and D. Laney, are doing development work.

COLORADO.

NOTES.—Georgetown *Courier*, Oct. 20: A tunnel is to be driven to drain and work the Bush lodge, Myers Bros. have two feet of ore on the Mineral Chief. Several new properties on Silver creek are shipping ore. The Alunde is making weekly shipments of high-grade ore. Nearly 100 tons of ore a month comes over the new Silver creek road. An ancient mine has been discovered on Bar Mountain, Socorro county, New Mexico. The mines of Leadville are outputting about 1000 tons of ore daily. The California mine in Gilpin county has the deepest shaft in Colorado and in the 1800-foot level the ore body is from 3 to 11 feet wide and of good-milling grade. The fact that the best mines are found where dykes of eruptive rock are most numerous, confirms the theory that the mineral is derived mainly from igneous rocks. Charley Sherman is spending a heap of muscle sinking a shaft on a dyke of diorite on D-mountain. He is down 40 feet and still a-going. Some of our old mining properties that have been idle for these many years are to be opened up. The reduction in the cost of supplies in the past few years and the reduced smelting charges, make it profitable to work mines now that a few years ago could not be made to pay.

THE ASPEN STRIKE.—Denver *Tribune-Republican*, Oct. 20: The Aspen mine, which has been the scene of so many sensational discoveries, now comes to the front with another that seems to eclipse all that have gone before. Last night a cave was struck which is 30 feet long and about 70 feet high. Lying on the wall is a bed of ore seven feet thick that is enormously rich. Some of it goes as high as 4000 ounces, and it will all average several hundred ounces. At the far end of the cave is a crevice running across the formation. This is of an unknown depth.

DAKOTA.

BALD MOUNTAIN.—Deadwood *Pioneer*, Oct. 16: There are few residents of the Hills who will not readily recall the excitement that set in about two years ago, with the mines of Bald mountain district as its cause. It was stated then, and stated truthfully, that developments to that date had served to demonstrate that the district had a virtually inexhaustible quantity of ore, and that whenever a satisfactory method of treatment was obtained, the annual output would exceed in aggregate value that of even the great belt mines, including the Homestake, Old Bed, De Smet, Deadwood Terra and Caledonia. At that time a method for economically getting the gold from the refractory ore had not been found. Since then, light has been thrown on the subject, and the Deadwood Reduction Works Co.'s leaching plant is rapidly approaching completion. Since it was definitely settled that leaching, by the Clark process, could be successfully applied, the energies of individuals and corporations have been spurred. Operations have been conducted on a scale more extensive than ever, until to-day, men familiar with the district since the first stake was driven and the first location made, as long ago as 1876, are emphatic that developments accomplished in the last 12 months exceed the total for the 11 preceding years. Ore enough is now in sight and available to keep a plant ten times the capacity of

that now building in constant operation for ten years to come.

IDAHO.

A NEW HAND-JIG.—Wood River *Times*, Oct. 17: D. W. Heaston of Deer Creek shipped from Huley last Saturday a new machine which is likely to cause many a hitherto unprofitable mine to be put on a paying basis. It is a combination hand-jig of his own invention which concentrates all concentrateable ore, and takes care of all the slums or tailings at the same operation, thus saving about 50 per cent of the labor of concentration. The miners here who have seen this new jig in operation say that it beats anything in the market, that it makes cleaner ore than can be made by any other means, and at nominal expense. The inventor has signed a contract to manufacture 50 of these jigs for \$150 each, delivered at Ophir, Col. They are to have a capacity of 50 to 50 tons of crude stuff per day.

TWENTY FEET OF GOOD ORE.—Reports from the Triumph Co. are to the effect that two veins of first-class jigging ore have been struck in the Mayleaf claim of that company and that the head of the crosscut is still in ore, although an aggregate width of over 20 feet of ore has been cut through. The ore came from 25 to 35 ounces of silver per ton, and will concentrate five tons into one. In fact, it is said to be much better, and to be almost good shipping ore without concentrating.

SMALLER MINES.—Leasers on the Clipper, across the river, D. C. Wallace and others, have about three tons of ore they will ship the coming week. The jig men—Ben Miller and partners—have worked over some ore from the Monday mine, Lookout mountain, and the returns are said to show up splendidly.

HUNTER DISTRICT.—Wardner *News*, Oct. 20: The work of development on the Morning lode is rapidly bringing it into the very front rank of mines. The lower tunnel in which work is now being prosecuted discloses a vein of galena seven feet in width, which is now shown up for a distance of 200 feet. This body of ore will concentrate at least two tons into one. It is estimated that there is in sight fully 20,000 tons. Under the able management of Martin Curran this property has been changed with two months' labor from a good prospect to an undoubtedly valuable mine.

HUNTER GULCH.—The grading for the Hunter flume is nearly completed and the work of construction will be commenced as soon as a sufficient quantity of lumber can be turned out by their sawmill, which has just commenced operations. The grading for the concentrator is being rapidly pushed for January.

EVOLUTION DISTRICT.—Big creek is gaining a good reputation from its number of fine locations that are showing up most satisfactorily as development progresses. The Blake brothers, owners of the Yankee Boy, located near the Polaris mine, shipped one carload of ore on Tuesday to the sampling works of Burlidge & Co., Cœur d'Alene City.

MONTANA.

THE MAGNA CHARTA TO START UP.—Inter-Mountain, Oct. 17: It was learned from Supt. Wm. E. Hall this morning that arrangements are being made for resuming operations on the Magna Charta mine, which has been lying idle for the past 12 months. He expects that work will commence on Monday. At the same time the old 20-stamp mill will be in dropping on ore. Supt. Hall is busily engaged in providing timber and workmen for repairing the damage to the 60-stamp mill by the recent fire. From present indications it looks as though the old reliable Alice mines and mills will be working on their former grand scale.

THE BELLONA MINE SOLD.—Yesterday the sum of \$65,000 was deposited in the First National bank of this city to be paid to Silas F. King and James A. Murray for the purchase of the Bellona mine by the Parrot Company. This sum is to be handed to the gentlemen named on the arrival from Washington of a mining patent which has been applied for. The Bellona lode joins the Parrot Company's mines immediately on the south.

A GOOD PROPERTY.—Butte *Inter-Mountain*, Oct. 13: Maj. Hornbrook and the Detrick Bros. have struck a pretty rich thing in the Carrie mine, located in the rear of Patrick A. Largey's residence on Broadway, and upon which they have secured a bond for \$50,000 for one year. The workings are not more than 80 feet deep and a level is being run at 50 feet in the shaft, in a westerly direction, where there is a fine body of ore between 3 and 4 feet wide. During four days of last week 23 tons were taken out which assayed 162 ounces silver and 59 in gold. The major thinks he has a property which will make him rich. A new hoisting engine is being placed on the L. Plata mine.

HARVEY DISTRICT.—Phillipsburg *Mail*, Oct. 17: John M. Long arrived in town Friday evening from Harvey district, about 30 miles from here, where he is developing some properties. Mr. Long reports that district as likely to become one of the most prominent in the Territory. The various mining locations show up exceedingly well, though little work has been done on any of them. Gold is by far the prevailing metal of the district, and the ore contains little silver or copper. The country is extremely rugged and mountainous and has all the indications of a rich mining region. The beauty of the district, according to our friend, is indeed remarkable. It will be necessary for considerable road-building to be done before any very heavy work can be prosecuted. While but 30 miles from here in a direct line, it requires about twice that amount of travel before it can be reached, going by rail as far as Bonita (about midway between Drummond and Missoula) and thence on horse-back about 15 miles in a southerly direction to the mines.

NEVADA CREEK PLACER MINES.—Mining *Review*, Oct. 6: In this extensive property there are, at present, ten men employed working on reservoirs, ditches, etc., and getting things into shape for a long season of placer-mining next summer. This force will be kept employed as late this fall as the weather will permit. As soon as practicable next spring the company will start a large force of men at work in the diggings, and unless the season should be an exceptionally dry one it is thought that the giants can be kept at work between four and five

months, when, judging from former cleanups at the end of the mining season, the product of the season's work will probably be astonishing. The gold obtained from these diggings is for the most part very coarse, and conservative experts have pronounced the entire 803 acres embraced in the place as profitable mining ground. The company has now something like 25 miles of water ditches in operation, to which extensive improvements are now being made, and additional ditches and reservoirs are soon to be added, which will make of these diggings one of the most valuable placer mines in the world.

AFFAIRS AT THE BLUEBIRD.—Inter-Mountain, Oct. 19: Supt. Booram of the Bluebird reports the mine to be looking better than ever. The ore bodies continue to improve as well as the assay value, which is making a most flattering showing. The bullion of late has been running as high as 820 ounces fine, and averages 800, which makes the Bluebird silver the purest in the camp. Mr. Booram states that President Van Zandt is highly gratified at the condition of affairs at the Bluebird.

NEW MEXICO.

AROUND KINGSTON.—Kingston *Shaft*, Oct. 16: The Comstock has let out a few men, until they can get the mine better drained. The Lady Franklin is preparing to sink deeper, but has trouble with her pumps. O. P. Boger, after taking out quite a lot of rich ore on his Hornet lease, has sold out to his partners. The mines on the Bonanza Hill are troubled with water, and are working fewer men and shipping less ore than usual. The Black Colt is not working any men; 100 much water for economical working. They are preparing to put in a steam pump and hoist. The Hornet is filled with leasers. Every place that has a show of ore has somebody at work on it. Mr. Geo. W. Grayson says the mining outlook at Hillsboro is constantly improving, and his own property is looking well; the deeper they go, the richer the ore gets.

OREGON.

SALES PENDING.—Bedrock *Democrat*, Oct. 15: Negotiations are pending for the purchase of several mining properties in the southwestern portion of Baker county and the sales will probably be consummated within the next few weeks. From present indications the outlook of the mines is very encouraging and there is every reason to believe that the coming of another spring will mark an era of activity in mining in Baker county never experienced before. The properties are all being fully developed and their permanency is no longer a question. The universal judgment of mining men is that it is a great mining district of unlimited wealth and will surely make this fact known to the world.

THE CONNOR CREEK MINES.—Capt. Joseph Myrick, superintendent of the Connor Creek mine, came to the city last Sunday with a large amount of bullion and shipped it to headquarters at Portland.

UTAH.

PARK NOTES.—Record, Oct. 19: The Russell process at the Marsac mill will be running in full blast in a week or two. The Woodside continues to look like a bonanza, and regular ore shipments are going forward. The machinery at the mouth of the Ontario three-mile drain tunnel is in place and nearly ready to be started up. Samples of ore taken from the West End tunnel show that the recent strike is a valuable one. The Wasatch marble quarries at the head of Snake creek are to be worked again, this time on a larger scale. Arrangements have been perfected whereby the Whitehead group, lately bonded for \$18,000 by J. A. Lenzi, will be developed through Slagle's Great Eastern tunnel.

ORE AND BULLION SHIPMENTS.—During the week Crescent shipped 160,000 pounds of concentrates. For the week just ended the Mackintosh sampler received 326,890 pounds of Ontario ore; 114,740 of Daly; 142,190 of Woodside lease, and 6590 of Southern Tier ore; total, 589,510 pounds. The product of Ontario bullion for the week was 42 bars, containing 21,351.79 fine ounces of silver. Yesterday 10 bars of Daly bullion, 70,664 fine ounces of silver, were shipped from the Marsac mill.

WASHINGTON.

ALLEGED GOLD DISCOVERIES.—Spokane Falls *Herald*, Oct. 8: A *Herald* reporter has been diligent in his search during the past week for additional facts regarding the alleged gold discovery as published in our last Sunday's issue. He had the good fortune to meet two experienced miners who had visited the locality named and spent some time there; their report is not at all flattering, in fact there is no cause for excitement, as they declare positively that what the former parties took for gold is not that metal, but a species of yellow mica. As the discoverers had never done any mining it is quite probable that they made the very common error that any inexperienced prospector is liable to make, and instead of the genuine article they found a quantity of "Pilgrim gold." While investigating this report our reporter ascertained the facts of another gold discovery near Little Baldy, about six miles from the city, which we give as we received it. Though we have seen some of the quartz and the assayer's report, we can vouch for nothing more. Some time since two prospectors named Doak and Detamore found quartz near Little Baldy; they had the surface rock assayed, and it gave a return of \$3.50 per ton in gold, with a trace of silver. Desirous of prosecuting development work on the two claims they had staked out, they enlisted Jasper Geesey and two other parties of this city, who have agreed to furnish all necessary supplies and capital. Whether or not gold exists in paying quantity near Little Baldy, the *Herald* is not advised.

IRON AND COAL.—The drill has already demonstrated that there is an abundance of the best quality of coal underlying Cle-Elum, and the pick has exposed mountains of the finest quality of iron within two miles of that city. Transportation facilities are already there, and it only remains for capital to establish the great rolling-mills and iron-works. Within the coming year there is but little doubt such works will be built, and Kittitas county will be the greatest manufacturing center in the Pacific Northwest.

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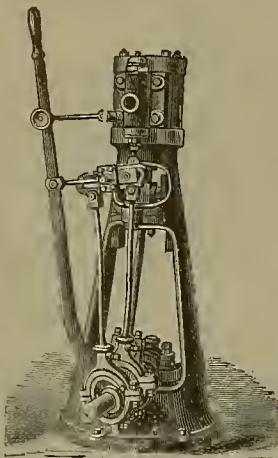
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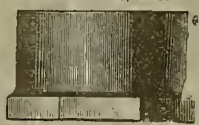
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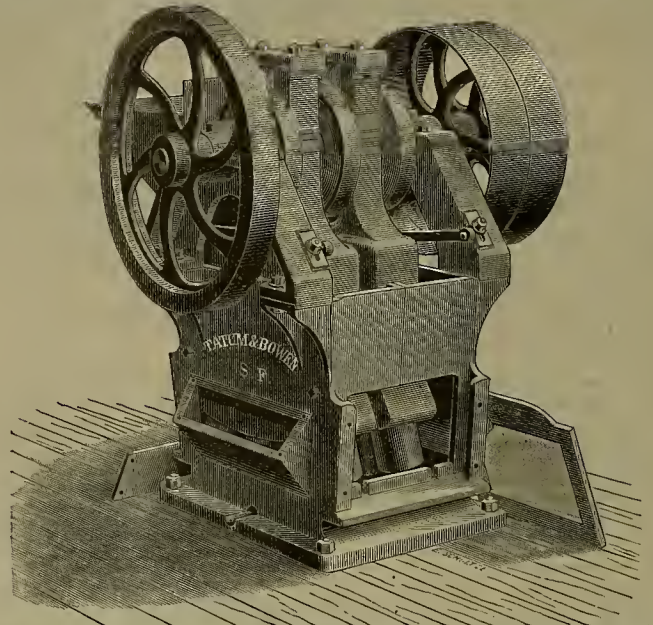
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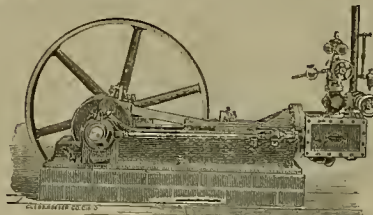
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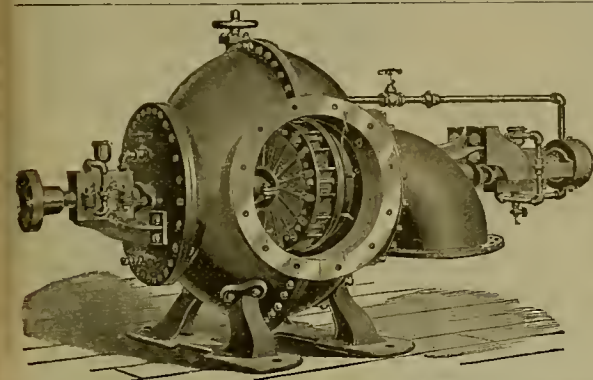
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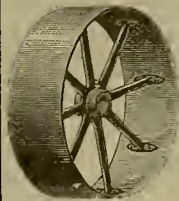
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In respect to capacity, SPEED OF DRILLING, perhaps it is in order to say that in EVERY AUTHENTICATIVE CONTEST for speed yet initiated, the RAND DRILLS have, without exception, BEEN VICTORIOUS. This fact, coupled with another important one, that the drills use much LESS AIR and cause LESS REPAIRS, has won for them nearly all of the Eastern mining trade, which has kept their works always busy.
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SPECIAL ATTENTION is called to the latest designed sectional Compressor just built for the Batopilas mine in Mexico, and to the Compound Engine Compressor built for the Anaconda mine in Montana.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. O. DENNISTON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Ores Sampled.

Assaying in all its Branches.

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Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of

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Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

**PERFORATED SHEET METAL**

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Oct. 25, 1888.

SILVER—The market the past week gained in strength, with quite an advance made on Tuesday in sympathy with higher prices abroad and also in New York. The demand with us is not of an urgent character, for large export buyers are only tempted by prices below the New York and English parity. A sale of silver was made yesterday at 94 55/100 cts. for export, although the bids made were at 94 1/2 cts. It is quite likely that ready sales cannot be made at over the latter figure. The output of silver bullion on this coast is light, and no perceptible increase is looked for until the mining companies in Nevada again commence to crush ore, which will be next month, in the Comstock district, but in other districts of the State no decided increase in the crushing of silver-bearing ore will take place before early in 1889. The fact must not be overlooked that though more ore will be crushed by the mills in the Comstock district this coming winter than for several years past, still the percentage in silver will be less. This opinion is based on the latest and most reliable reports from Virginia City, which state that the work going on in several of the mines make it certain that what is called the Red Lode is a veritable lode, rich in mineral ore in which gold predominates, and to this lode, for some time at any rate, will the mills have to look for ore to crush. The work being done in one of them, West Con. Virginia, already demonstrates that the lode is much more valuable than claimed by some, and with further prospecting work it is claimed that there will be a revival of mining on the Red lode, which lies west of the Bonanza lode, equalled only by the "bonanza days."

The market closed weaker to-day in sympathy with a decline of the London market at 44 1/4 d. Ours is quoted at 94 1/2 @ 94 3/4 c.

QUICKSILVER—The market has held to strong prices throughout the week. A quicker domestic demand from the mines is reported, with the more distant districts drawing quite heavily. It is claimed by many that the consumption on this coast is increasing. The export movement is of a steady character. The local market is quoted at a decline of 2¢ on last week's prices.

LEAD—The market has been subjected to Eastern influences and consequently prices receded, but afterward gained in strength with a slight advance reported. The New York market broke on Oct. 19th under a confirmation of the report that Nathan Currier & Co. of that city had suspended. This firm in connection with Corwith & Co. of Chicago worked the corner in lead, and their suspension naturally caused a stampede with the bull element. Under a strong bear raid October lead was beaten down to 40¢. This was followed by a sale the next day at 39 7/8¢ per 100 lbs. These low prices brought in buyers, causing a stronger market to obtain.

TIN—The price for prompt shipment is said to be strongly maintained for tin plate. The sales so far, it is reported, aggregate over 90,000 boxes at from \$4.05 to \$5.15 per box. In pig, the market is without any special features to note. For tin plate on spot the demand is slow. The position of tin abroad is very strong. Late mail advices from London report as follows: "The value of Straits tin during the first quarter of the year ranged between £160 and £170, and while these unusually high prices stimulated production, they checked consumption to such a degree that the deliveries in the first four months averaged 1225 tons per month. With the fall in the price to £75 tons at the end of June the demand rapidly increased until the total stock at the end of last month stood at 13,419 tons, thus showing that 10,265 tons had gone into consumption since the end of April. But since the last statistical return was published, the position has again improved, and the stock in London at the end of the first fortnight in September was further reduced to 2700 tons."

COAL—The importation of coal both at this port, San Diego, and San Pedro continues free, with a large proportion sold to arrive. Contrary to expectations in certain quarters, prices do not advance, while, on the contrary, there appears to be an easier feeling. The action of the Southern Pacific railroad in selling all their employees their coal at cost price will have some effect on the market for house coal. The coal yards in this and adjoining cities are reported to be full.

Since writing the above a leading importer reports an advance in Cumberland and Egg to arrive, owing to higher freights abroad.

IRON—The market for spot is active. The last sale of Oregon reported was 1000 tons at \$30; since then none has been sent here, it being used in Oregon. American soft is higher. There is no Gleanerock or Eglinton in the market. Spot prices for foreign iron are below the parity of the supply markets.

BORAX—The market is quiet with quotations nominal.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Oct. 25, 1888.—The following are the closing prices the past week:

	Silver	Silver in London	New York	Copper	Lead	Tin
Thursday	43	033	\$17 50	\$4 25	\$23 40	
Friday	43 1/16	93 15/16	17 60	3 95	23 50	
Saturday	43 1/16	93 15/16	17 45	3 97 1/2	23 25	
Monday	43 1/16	94 1/16	17 35	4 02 1/2	23 25	
Tuesday	43 1/16	94 1/16	17 45	3 97 1/2	23 10	
Wednesday	43 1/16	94 1/16	17 45	3 95	23 00	

The market closes as follows: Quicksilver moved to 65¢, following the London advance to 96¢. Copper is without interest. Lake Ingot is nominal at 17 1/2¢; casting brands, 16¢@16 1/2¢. Liberal buying orders followed the collapse of the lead corner. The closing price is from \$3 90¢@4 for spot. Borax is steady, with moderate sales. California refined is quoted at 8 1/2¢@8 3/4¢; concentrated, 8¢@8 1/2¢. Pig iron is firm. Tin is firm with a fair inquiry.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Tin firm, advancing 25 points on spot, and 20 to 30 on futures, Copper unchanged. Lead weak.

Spelter dull. Pig iron, dull, but firm. Large consumers have all the iron they want for the present, and makers are busy delivering it to them, so that small lots comprise the bulk of the business. Manufactured iron, without being specially active, there is a good business doing, and prices are steadily maintained. One thousand tons of skelp was taken at \$1.95, although sellers are firm, and ask 2¢ for the general run of orders. Old rails, negotiations are in progress for a large lot of T's and D. H.'s mixed, with about \$2.4 as the probable price. Scrap iron, firm and in good demand, at full prices.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt deliveries. Au-trailian Tin, @—, Biliton Tin, @—, Banca Tin, @—, Baltimore Copper, \$16.00@—; Orford Copper, \$16.00@16.25; P. S. C. Copper, @—; Foreign Lead, \$5.00@5.25; Foreign Spelter, \$5.40@5.50; Antimony, \$9.75@13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Oct. 25, 1888.

ANTIMONY—French Star	13	14
BORAX—Refined	74	75
Powdered	74	75
Concentrated	61	62
COPPER—		
Bolt	26	27
Sheathing	26	—
Ingot	15 90	15 00
Wire B&S	—	—
ROY—Gleanerock	—	—
Eglinton, ton	—	—
American soft, No. 1, ton	—	—
Oregon Pig, ton	—	—
Clay Lane White	—	—
Shots, No. 1	—	—
Bar Iron (base price) lb.	22	3
Chrome iron ore, 1/2 ton	8 00	10 00
LEAD—		
Sheet	11	12
Pipe	7	—
Spot, discount 10% on 500 bags	155	—
Buck, 1/2 bag	—	—
Chilled, do.	2 05	—
SPKEL—English, lb.	16	20
Canton tool	91	—
Black Diamond tool	10	16
Pick and Hammer	8	10
Machine	4	5
Toe Calk	4	5
TINPLATE—Coke	5 00	5 15
Chapman, 14x20	6 75	6 25
do roofing, 14x20	5 50	5 12 1/2
Pig tin, 8 lb.	242	25
QUICKSILVER—By the flask	—	45
Flasks, new	1 05	—
Flasks, old	85	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.		Per Ton.
Australian ...	\$11 50 @12 00	Cardiff.....	11 00@11 50
LiverpoolStm	12 00 @12 50	Lehigh Lump.	15 00@15 50
West Hartley.	12 50 @13 00	Cumberland bk17	00@13 00
Scotch Splint.	12 00 @12 50	Egg, hard.....	15 00@15 50

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING OCT. 15, 1888.

391,359.—STEAM BOILER.—P. F. Dundon, S. F.	
391,054.—WHIFFLETREE HOOK.—W. A. Ladd, Colfax, W. T.	
391,165.—JACK.—L. A. Lander, Tacoma, W. T.	
391,393.—GRAIN HEADER.—S. J. Myrick, Helix, Ogn.	
391,196.—PROPELLER.—D. B. Rowland, Shasta, Cal.	
391,198.—FENCE POST.—Saxon & James, Colfax, W. T.	
391,344.—CONCENTRATOR.—Starr & Kinley, Grass Valley, Cal.	
391,344.—SAWING MACHINE.—Surprenant & Feigunson, Asto, Ia, Ogn.	

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

HOSE BRIDGE.—Henry Tucker and Patrick J. Keegan. No. 390,920. Dated Oct. 9, 1888. This invention belongs to that class of bridges or frames which are used for carrying hose over railway tracks in the streets of cities, whereby interference with the travel of the cars is avoided. This bridge is made of vertically movable sides composed of telescoped pipe sections. The sides are connected so that they shall operate simultaneously under the pressure of water introduced to one of the sides from the fire engine. The hose is coupled to that side and supported by the other side, and when the water is turned on, the pressure on the telescoped pipe sections, of which the sides are composed, forces them out and thus raises the bridge and hose. Suitable supports are provided to hold it in an elevated position.

MOTOR.—George F. Wells, S. F., assignor of one-half to Manley C. Lawton, Staten Island, Cal. No. 390,929. Dated Oct. 9, 1888. This motor is designed to receive and convert an intermittent or irregular power—such as from a treadle or treadles—into a steady, continuous motion. The main object of the invention is to provide a simple and delicate motor specially adapted for use in automatic musical instruments and transmitting the power of the treadles to the music-roll. The motor consists in a pulley to be driven, a friction pulley engaging it and carried by a pivoted bracket, a

MINING SHAREHOLDERS' DIRECTORY.

COMPILED WEEKLY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DEBITANT SALE.	SECRETARY.	PLACE OF BUSINESS.			
American Eagle M Co.	California.	1.	10.	Sept. 20.	Oct. 25.	Nov. 15.	J. M. Reynolds.	573 California St
Alt's S M Co.	Nevada.	38.	50.	Sept. 28.	Nov. 5.	Nov. 25.	L. Osborn.	309 Montgomery St
Andes S M Co.	Nevada.	34.	25.	Oct. 5.	Nov. 12.	Dec. 3.	B. Burris.	309 Montgomery St
Baltimore S M Co.	Nevada.	3.	25.	Sept. 22.	Oct. 25.	Nov. 13.	A. R. Gilm.	402 Montgomery St
Belcher M Co.	Nevada.	35.	50.	Sept. 18.	Oct. 23.	Nov. 13.	J. Crockett.	327 Pine St
Bodie Con M Co.	California.	3.	50.	Sept. 24.	Oct. 30.	Nov. 30.	G. W. Sessions.	399 Montgomery St
Best & Belcher M Co.	Nevada.	41.	25.	Oct. 16.	Nov. 21.	Dec. 11.	L. Osborn.	309 Montgomery St
Cristian M & M Co.	Arizona.	—	10.	Sept. 1.	Oct. 15.	Nov. 5.	C. B. Krutzejer.	328 Montgomery St
Crown Point G & S M Co.	Nevada.	50.	50.	Oct. 1.	Nov. 5.	Nov. 25.	G. E. Newlands.	329 Pine St
Cuba M Co.	Nevada.	26.	50.	Oct. 8.	Nov. 13.	Dec. 5.	C. E. Elliot.	309 Montgomery St
Cal Imperial M Co.	Nevada.	25.	50.	Oct. 18.	Nov. 21.	Dec. 12.	O. L. McCoy.	309 Pine St
Caladonia S M Co.	Nevada.	43.	15.	Oct. 19.	Nov. 21.	Dec. 12.	A. S. Croth.	414 California St
Del Monte M Co.	Nevada.	1.	23.	Oct. 15.	Nov. 20.	Dec. 12.	J. W. Pew.	310 Pine St
Empire M Co.	California.	1.	25.	Sept. 18.	Oct. 22.	Nov. 3.	A. F. Low.	77 Nevada Block
Flower Gravel M Co.	Nevada.	1.	25.	Oct. 1.	Nov. 16.	Dec. 10.	J. Moritz.	309 Montgomery St
Horseshoe Bar Con M Co.	California.	1.	30.	Oct. 2.	Nov. 9.	Nov. 30.	A. K. Durbin.	309 Montgomery St
Gould & Curry S M Co.	Nevada.	60.	30.	Oct. 2.	Nov. 9.	Nov. 30.	A. K. Durbin.	309 Montgomery St
Gray Eagle M Co.	California.	9.	55.	Sept. 4.	Oct. 10.	Oct. 30.	O. H. Bogart.	327 Pine St
Gr West & Q M Co.	California.	2.	15.	Sept. 18.	Oct. 22.	Nov. 12.	A. Halsey.	328 Montgomery St
Grand Prize M Co.	Nevada.	15.	25.	Oct. 13.	Nov. 17.	Dec. 5.	R. R. Grayson.	309 Montgomery St
Horseshoe Bar Con M Co.	California.	1.	25.	Oct. 2.	Nov. 9.	Nov. 30.	A. K. Durbin.	309 Pine St
Justice M Co.	Nevada.	47.	25.	Sept. 25.	Oct. 31.	Nov. 19.	R. E. Kelly.	419 California St
Keyes S M Co.	Nevada.	3.	25.	Sept. 22.	Oct. 24.	Nov. 15.	M. P. Minor.	328 Montgomery St
Lord of Lorn G & S M Co.	Nevada.	5.	10.	Sept. 8.	Oct. 12.	Nov. 2.	R. N. Van Brunt.	3 F. emont St
Mayflower Gravel M Co.	California.	1.	25.	Oct. 1.	Nov. 16.	Dec. 10.	J. Moritz.	309 Montgomery St
Mono G M Co.	California.	28.	50.	Sept. 20.	Oct. 23.	Nov. 23.	G. W. Sessions.	309 Montgomery St
Montrose M Co.	Colorado.	1.	14.	Oct. 3.	Nov. 12.	Dec. 15.	F. E. Luty.	330 Pine St
North Belle Isle M Co.	Nevada.	13.	50.	Oct. 23.	Nov. 27.	Dec. 19.	J. W. Pew.	310 Pine St
North Con. Monmouth M Co.	Nevada.	1.	30.	Oct. 15.	Nov. 19.	Dec. 11.	J. W. Pew.	310 Pine St
Potosi M Co.	Nevada.	31.	50.	Oct. 1.	Nov. 7.	Oct. 27.	C. E. Elliot.	309 Montgomery St
Planet Con. Ditch M Co.	California.	7.	01.	Sept. 23.	Oct. 25.	Nov. 12.	J. K. Smith.	Grass Valley
Puget Sound Iron Co.	Wash. Terr.	12.	1.00.	Oct. 23.	Nov. 29.	Dec. 21.	A. Halsey.	328 Montgomery St
Savage M Co.	Nevada.	71.	50.	Oct. 4.	Nov. 7.	Nov. 27.	E. B. Holmes.	309 Montgomery St
Pacific Iron, Salt & Soda Co.	California.	1.	05.	Oct. 1.	Nov. 16.	Dec. 10.	J. Moritz.	309 Montgomery St
Tetrahedron G M & M Co.	California.	1.	02.	Sept. 8.	Oct. 8.	Nov. 3.	W. J. Gurnett.	309 Pine St
Uah Con M Co.	Nevada.	5.	03.	Oct. 4.	Nov. 8.	Nov. 26.	A. H. Fish.	309 Montgomery St
Virginia Creek Hyd M Co.	California.	6.	06.	Aug. 29.	Oct. 3.	Oct. 29.	J. M. Quay.	406 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alpha Con M Co.	Nevada.	C. E. Elliot.	309 Montgomery St.	Annual	Oct. 30
Confidence M Co.	Nevada.	A. S. Groth.	414 California St.	Annual	Nov. 9
Kosuth M Co.	Nevada.	C. K. Sturtevant.	328 Montgomery St.	Annual	Oct. 30
Mayflower G M Co.	California.	J. Moritz.	328 Montgomery St.	Annual	Oct. 29
Occidental Con M Co.	Nevada.	A. K. Durbin.	309 Montgomery St.	Annual	Nov. 5

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	Oct. 11
Confidence S M Co.	Nevada.	A. S. Groth.	414 California St.	1.00	Aug. 6
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	25	Aug. 27
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	July 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50	Aug. 8
Isham M Co.	California.	—	Grass Valley	50	Oct. 10
Standard Con M Co.	California.	J. W. Pew.	310 Pine St.	15	June 12

power spring for turning the friction pulley in one direction and connections with the treadles for alternately winding the spring and pulling the bracket to disengage the pulleys, and relieving the spring and bracket to effect the re-engagement of the pulleys and the rotation of the main pulley under the recoil of the power spring.

STEAM BOILER.—P. F. Dundon, S. F. No. 391,359. Dated Oct. 16, 1888. In a former patent issued to Mr. Dundon in August, 1886, he showed a boiler composed of two separate and independent shells, one constituting or containing the furnace and the other containing the flues to return the heat to the front, and in connection with these two separate shells, flues and furnaces, return passages were employed on the sides. In the present invention he employs a single boiler-shell, with a casing or jacket surrounding it, connected at the sides by an internal partition, which divides the jacket into an upper and lower compartment. The boiler has a furnace at one end and a combustion chamber at the opposite end, with flues or tubes extending through from the combustion chamber to the smoke-box. Chambers or compartments extend along the exterior of the lower sides of the boiler to the furnace end, forming an extension of the smoke-box, through which the products of combustion pass, and there is a second chamber or compartment with which the first one communicates, said second compartment extending over the top of the boiler to the smoke-stack, and separated from the lower compartment by the horizontal internal partition. This partition terminates a short distance from the back end on both sides, and the outlet to the stack is formed at the front end above the smoke-box. The hot gases and products of combustion are passed first through the main flue to the adjacent combustion chamber, thence through the internal tubes to the furnace end, passing thence into the lower compartment. The products now pass along the lower compartment to the space at rear between the open ends of the partition, through which space they pass to the upper compartment and are finally led along that to the outlet of the stack.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

GRAY'S HARBOR COMMERCIAL CO., Oct. 20. Object, to deal in lumber and carry on a general logging and lumber business in Washington Territory and elsewhere. Directors—Charles S. Holmes, Charles F. Talbot and William H. Talbot, William J. Adama, Charles Hanson, Edward M. Herrick and George W. Watson. Capital stock, \$150,000.

SANHEDIN MILL AND LUMBER CO., Oct. 23. Capital stock, \$120,000. Directors—W. O. Murdoch, Dwight W. Grover, Edward Foster, George L. Fitch, Frank D. Scott, Frank Markey, L. F. Grover, C. M. Miller and W. P. Chase.

FIDELITY MUTUAL AID ASSOCIATION, Oct. 20. Directors—W. F. Gibson, H. D. Wallace, E. F. Card, J. L. M. Shetterly, L. D. Little, W. F. Hubbard, J. E. Shuterly.

THE International Smelting Co. of El Paso have raised their capital to a half-million dollars. They will build more reduction works.

THE Copper Queen mine, Arizona, paid a dividend of \$70,000 on the 1st inst.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 6.	WEEK ENDING Oct. 11.	WEEK ENDING Oct. 18.	WEEK ENDING Oct. 25.
Alpha.....	2.35	2.85	2.60	2.95
Alta.....	1.30	1.70	1.45	1.55
Andes.....	.90	1.05	.90	1.05
Argenta.....	.....	.....	.10	.....
Belcher.....	4.25	5.1	4.70	5.1
Bodie.....	.....	.....	4.55	6.00
Bodie Tunnel.....	.....	.....	.....	8.50
Billion.....	3.35	4.0	3.50	4.85
Baltimore.....	1.25	1.50	1.30	1.55
Belle Isle.....	.25	.35	.25	.35
Bodie Con.....	.40	.50	.40	.50
Benton.....	1.15	1.30	1.20	1.51
Bodie Tunnel.....	.....	.....	1.25	1.65
Bulwer.....	.....	.....	2.00	2.7
Con. Va. & Cal.....	.55	.60	.60	.70
Challenge.....	.84	1.04	.95	1.14
Champion.....	4.00	5.1	4.00	5.1
Chollar.....	2.60	2.90	2.55	3.00
Confidence.....	12	20	16	21
Con. Imperial.....	.45	.75	.60	.75
Caladonia.....	.35	.40	.34	.40
Con. Pacific.....	.....	.....	.40	.55
Crown Point.....	1.15	1.30	1.20	1.51
Crocker.....	.75	.85	.75	.85
Central.....	.....	.30	.....	.35
Dudley.....	.....	.....	.38	.50
East B. & B.....	.....	.....	.....	.....
Eureka Con.....	.....	3.35	3.50	3.50
Eschschuer.....	1.05	1.25	1.10	1.65
Excelsior.....	1.05	1.25	1.10	1.65
Gold & Curry.....	2.60	2.90	2.40	3.00
Hale & Norcross.....	4.40	5.00	5.25	6.00
Holmes.....	.....	.....	6.7	8.75
Independence.....	.....	.40	.....	.....
Julia.....	.....	.....	.36	.35
Justice.....	.30	.40	.35	.40
Kentuck.....	.90	1.00	1.05	1.40
Kentucky.....	3.00	3.30	3.07	3.15
Ledy Walk.....	.45	.50	.45	.50
Martin White.....	.....	.....	.50	.65
Mono.....	.80	.90	.80	.90
Mexican.....	3.30	4.00	3.45	4.00
Mt. Diablo.....	.....	.....	3.00	3.50
Nevada.....	.....	2.00	.....	2.50
Nevada Belle.....	1.75	2.25	2.05	2.10
North Belle Isle.....	2.65	2.75	2.60	2.75
Niagara.....	.....	.....	3.00	3.50
New Queen.....	3.85	4.20	3.85	4.40
Occidental.....	1.35	1.55	1.35	1.55
Ophir.....	5.50	7.1	5.00	6.50
Overman.....	1.50	1.80	1.55	1.80
Potosi.....	2.25	2.60	2.20	2.60
Perr.....	1.65	1.75	1.80	1.75
P. Sheridan.....	.....	.60	.45	.55
Silver Star.....	.....	.....	.50	.60
Sierra Nevada.....	2.70	2.90	2.45	2.95
Silver Hill.....	2.95	3.45	3.05	3.40
Scorpion.....	3.15	3.50	3.30	3.55
Silver Hill.....	.50	.60	.55	.65
Silver King.....	.....	.65	.55	.65
Syndicate.....	.....	.....	.65	.75
Union Con.....	3.05	3.60	3.20	3.75
Utah.....	1.15	1.30	1.00	1.15
Yellow Jack.....	4.00	4.50	5.00	5.00
.....	.....	.....	6.75	7.50

Mining Share Market.

The market has by no means been steady during the past week, though it has been at times strong. There has been fluctuation from day to day, though the general tendency has been rather upward. The brokers are pleased at the unwonted activity, as it has given them more to do than for months past. As to work on the Comstock, the *Enterprise* says:

Never before in the history of the Comstock have there been seen so many different mines that were simultaneously yielding paying ore. Ore is being taken out nearly all along the line of the Comstock—there are only a few breaks—and there are also several outside mines that are now producing considerable quantities of good milling ore. The new body of ore found on the line between the Savage and the Halo and Norcross is a fine one. An eight-foot vein of \$50 ore would of itself constitute a big mine in Idaho, Montana, Arizona and other mining regions. The new west ore body, on the 300 level of the Best and Belcher, though not yet showing up as well as the new recent strike in Savage and Norcross, bids fair to lead to something of value.

Other new developments will probably soon be heard from—are now about ripe—which, with the resumption of ore reduction at the mills on the Carson river, will keep the market climbing.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Lexington, Oct. 13, \$25,000; Hanauer, 17, \$1600; Crescent, 17, \$4900; Germania, 17, \$2258; Hanauer, 14, \$3450; Germania, 14, \$1721; Hanauer, 13, \$3700; Howard, 17, \$1700; Blue bird, 17, \$12,000; Con. California and Virginia, 20, \$62,302; Germania, 20, \$1733; Crescent, 18, \$3600; Hanauer, 19, \$4100; Germania, 19, \$1871; Mt. Diablo, 24, \$7153; Nevada Queen, 24, \$20,000.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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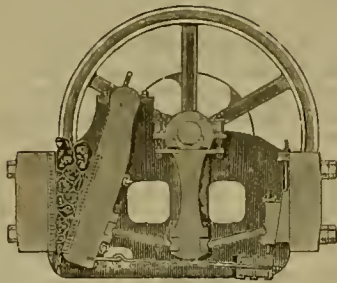
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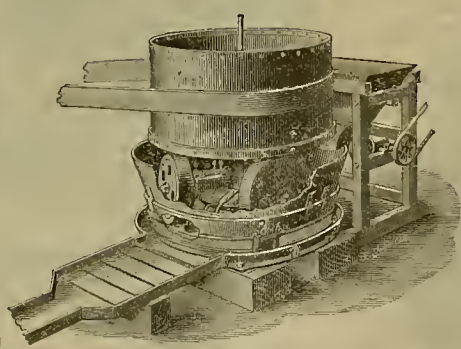
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DELINQUENT SALE NOTICE.

Gray Eagle Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Placer county, California. NOTICE.—There are delinquent upon the following described stock, on account of Assessment (No. 3) levied on the 4th day of September, 1888, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificates.	Shares.	Amount.
D. Bowers.....	73	500	\$25 00
Wm. Mc Gowan.....	379	10	2 40
Theo. Weigel, Trustee.....	364	8	40

And in accordance with law, and an order of the Board of Directors, made on the fourth day of September, 1888, so many shares of each parcel of such stock as may be necessary, will be sold at public auction at the office of the Company, room 9, No 37 Pine street, San Francisco, Cal., on Tuesday, the thirtieth (30) day of October, 1888, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

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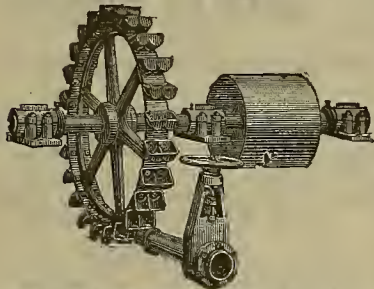
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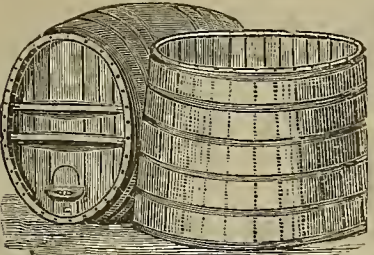
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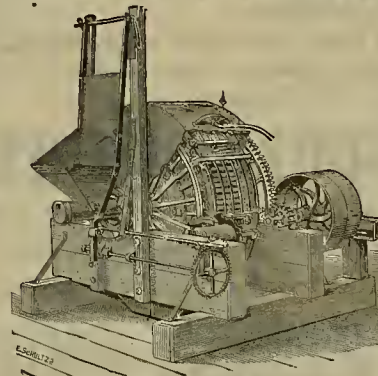
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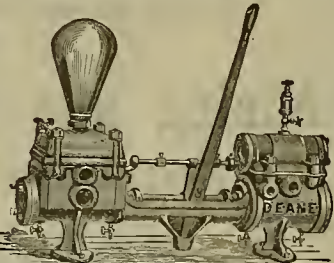
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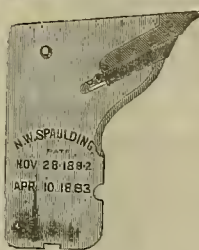
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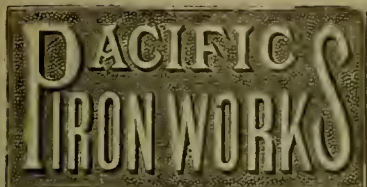
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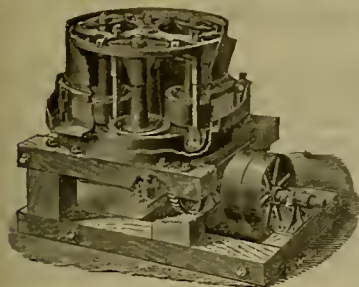
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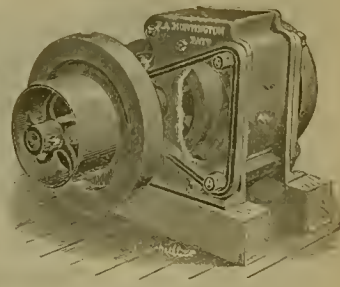
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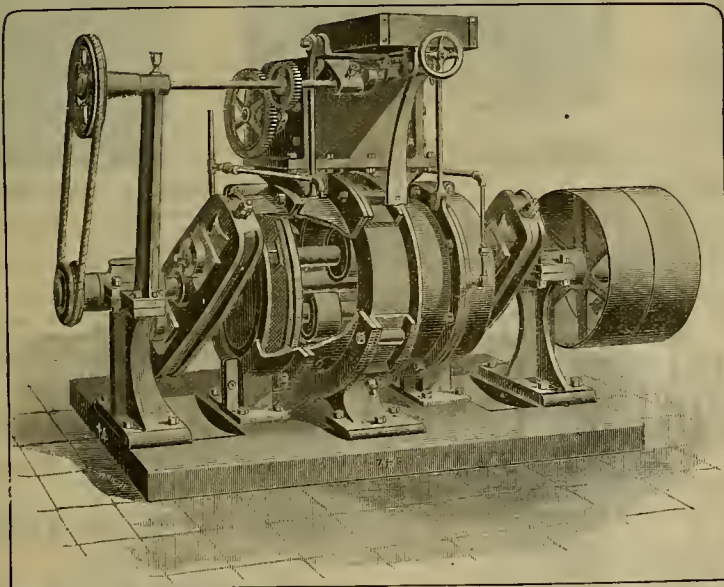
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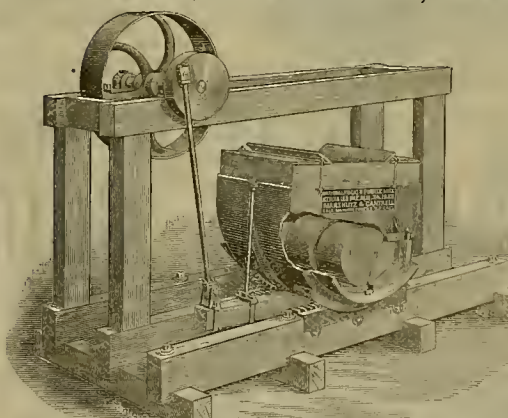
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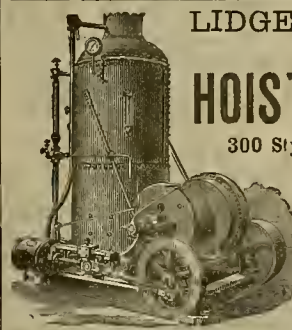
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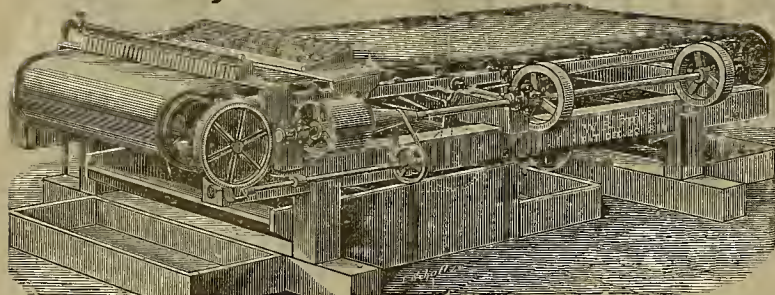
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THE MONTANA COMPANY (Limited).

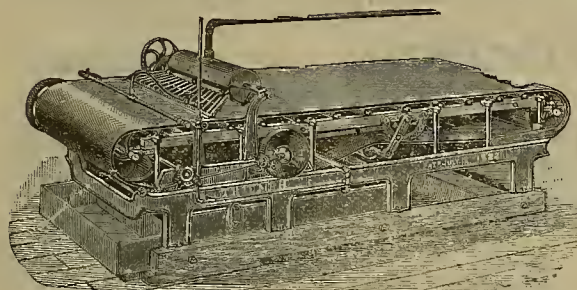
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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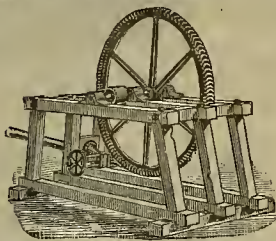
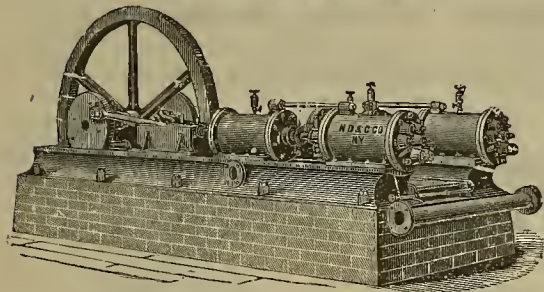
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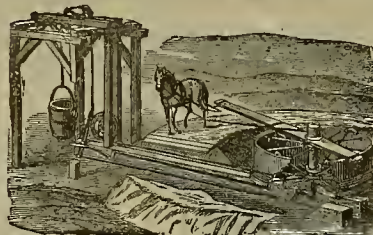
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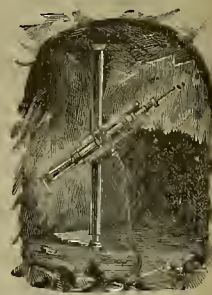


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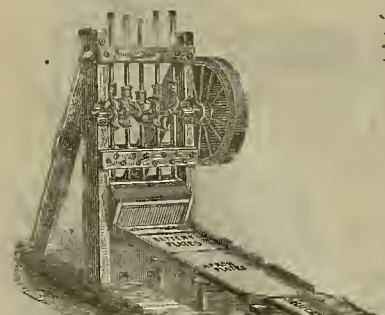
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

TWENTY-PAGE EDITION.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 3, 1888.

VOLUME LVI.
Number 18.

Sulphuric Acid Manufacture.

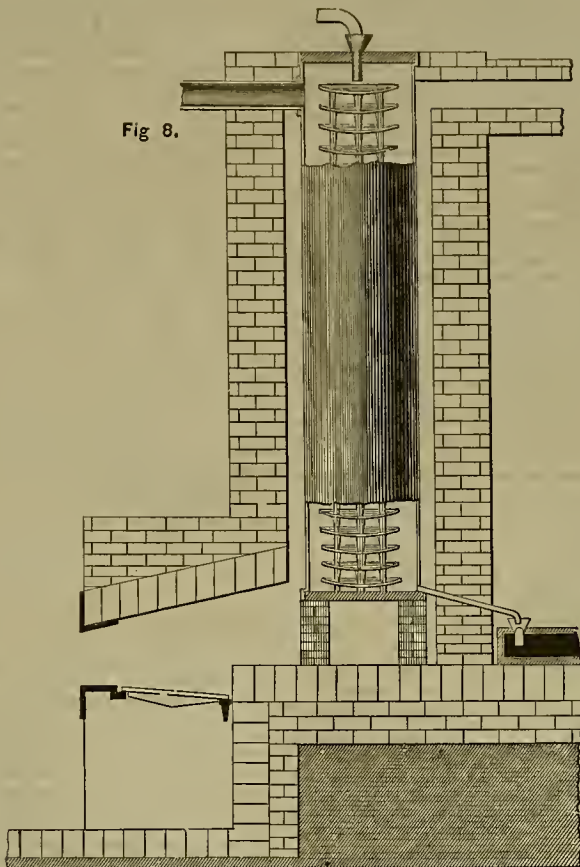
One of the radical changes mentioned by Mr. Adams in his paper from which we have quoted in the last two numbers of the PRESS, is the employment of iron vessels to transport the acid. The use of iron vessels in this connection opened up a new avenue for that metal, viz.: for use in place of glass or platinum as concentrating apparatus. Experiments to conduct the details in this direction have been made almost wholly by sea-board works, handicapped by locality, and forced to reduce the costs in manufacture to meet competition from more modern works erected at points of consumption.

One of the earliest examples of the use of iron is shown in Fig. 7, a type of pot in general use for the manufacture of nitric acid during the last 50 years. It was about 1869-70 that experiments were made with this pot, in the manner of the glass-retort procedure, viz.: filling the pot full of pan-acid and boiling until sufficiently condensed.

In the drawing of Fig. 7, the pot is represented as built entirely within the walls of the fire-place, but the earlier experiments were with naked tops, therefore subject to greater corrosive action than the sketch would indicate.

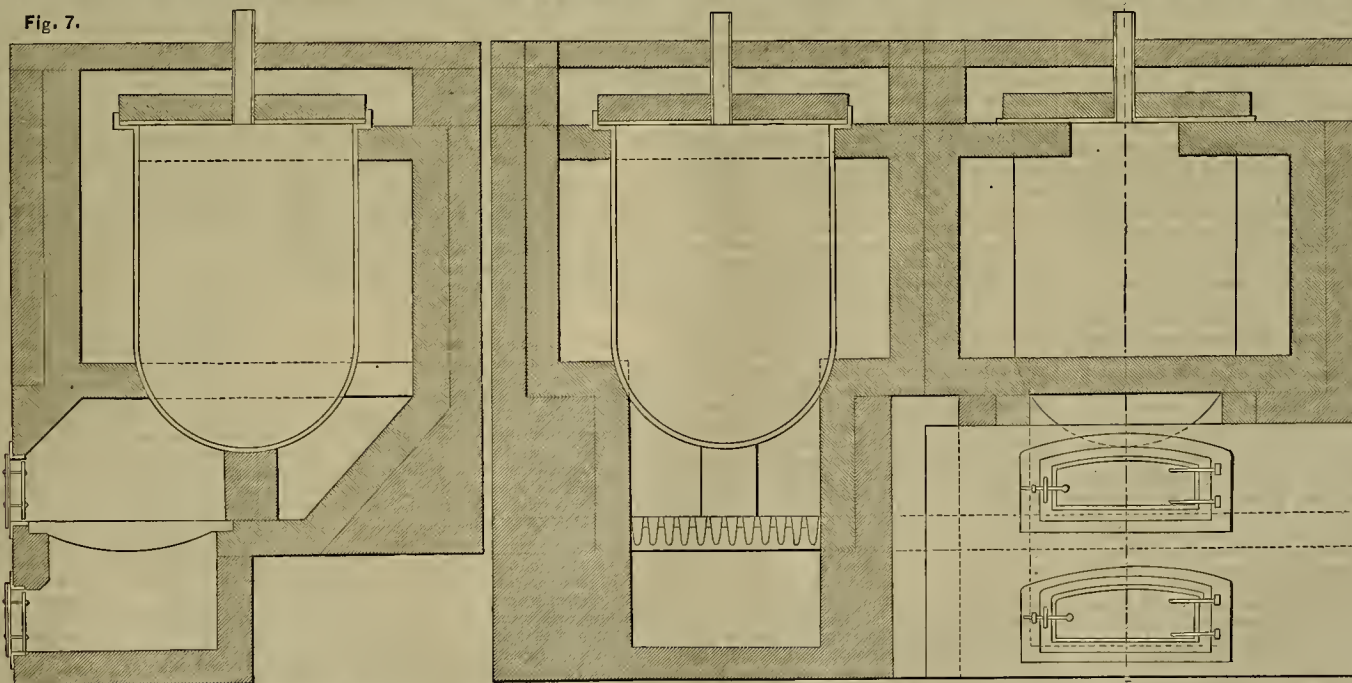
Another experiment attempted about this time, as an outcome of the former test, is illustrated in Fig. 8. A cast-iron cylinder was built into a chimney-like furnace-space, so as to confine the heat closely to the metal from bottom to top. The cylinder was closed with slabs of non-corrosive stone (such as are employed for the fronts of nitric stills), and the space inside was nearly filled with saucers of porcelain, set one upon the other from the bottom. Pan-acid

Fig. 8.



CAST-IRON CYLINDER, 1870.

Fig. 7.



APPARATUS EMPLOYING IRON POTS IN MANUFACTURING SULPHURIC ACID, 1869-70.

ran into the top sancer and spread itself thinly over the sloping bottoms of the saucers until it was taken from the exit-pipe in a sufficiently concentrated condition (66° B.). The outlet for

chimney-gases, the care of the concentrated vitriol, and other details, will be understood.

It is plain that a cylinder evenly and strongly heated at all times means an inner radiation

which will very rapidly drive off all the water from the thinly flowing liquid. So great an evaporative surface with so small a construction-cost, promised a most successful result;

but difficulties not connected with the work itself, though involving a change of base for the experimenter, brought the experiment to a close. It is here noted to show how closely success and failure are allied. In the hand of a practical man, allowed the privilege of experimenting, this apparatus should have been made an unquestionable success, the germ of what we now know to be successful working being certainly shown in this construction.

It is unnecessary to detail many of the changes which followed the above plant, the next decided step being shown in Figs. 9 and 9a. (see page 297.)

This design also closely follows the successful platinum apparatus of that time, as this reproduction of the original drawing will prove. The action of this form of still in service will readily be understood, the construction being modified from time to time, so that the still was finally inclosed in the furnace, the fire surrounding it completely.

THE LIVERMORE COAL MINES.—Speaking of the new coal mine, the *Livermore Herald* says: The plant for the Pen Daren incline is at the coal mines, arrived last week, and is now being hauled by T. E. Knox. The plant consists of a large hoiler and an engine and hoisting machinery. It will soon be in position and working order, when this incline will be pushed down into the coal. The Pen Daren vein is eight feet wide. The quality is not quite equal to that of the Richards vein, but the quantity is greater. Both veins will be worked by the Livermore Coal Mining Company.

A FAINT comet, with a nucleus and tail, was discovered by Mr. Barnard at the Lick Observ-

atory October 31st, at 4:51 A. M. Its position was right ascension 9 hours and 46 minutes, south declination 15 degrees and 22 minutes. Motion, northeast.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—Eds.

Kern County Mines.

EDITORS PRESS:—I have received from your office a marked copy of the MINING AND SCIENTIFIC PRESS, dated in May, in which my attention is drawn to an article which seems to have been written from "Kingsville," wherever that may be, in which attention is drawn to the Sumner mine, or the "Big Blue," as it is called; and in the article it is claimed that the work remains idle because there is no pumping machinery for draining the mine.

I have made diligent inquiry regarding the mine of men who stood in the stopes for years, and am compelled to say that the article is in a measure misleading.

There is a drainage tunnel which discharges into Kern river at high-water mark. A shaft has been sunk in the bed of this tunnel 150 feet deep, and some stoping has been done as low as 60 feet below the level of the drainage tunnel; but of the \$3,000,000 which the mine is supposed to have yielded, probably not one-fourth of one per cent came from below the level of the drainage tunnel.

Litigation is the bane of California gold mining, and how much it may have had to do in maintaining in idleness what was once the best quartz-mill in the State I would rather leave for others to declare.

J. P. Jones once invested heavily in the mine, and by some means was divested of his title. The present holders, or at least successors, attempted to run it, but found results so unsatisfactory that it was leased out to an association of tributaries—men who had worked the mine and knew the secret causes of failure. These men are said to have been making money "hand over fist," as the saying is, when the holders suddenly terminated the lease and the mine stopped.

The difference in the plan of working may throw some light on the different results. The vein is, perhaps, one of the most complicated in the State. The main ledge is about 100 feet wide, and runs about 20 degrees to the north of east. What is known as the west vein comes in directly from the north and enters within the walls of the main ledge; and from there to the south end of the principal working is separated from the main ledge by a thin casing, maintaining its peculiar characteristics throughout. It is from three to five feet wide, and carries none but high-grade ore. Another similar vein known as the Lady Belle comes in from the southwest. Carrying between the angles of these two side veins is the Beauregard, which has not yet been traced to a connection with the system. These three feeders carry high-grade ore. Then there is within the walls of the main ledge a stratum of good rock ten feet wide, and another stratum of fair rock 14 feet. The tributaries believed that the remaining 70 or 80 feet of vein matter was of too low a grade to pay under the present mode of treatment; and, therefore, unlike the other management, left it in the mine.

I have lately learned that there are vast bodies of ore left in these tributary veins, above the level of the drainage tunnel.

The foundry, machine-shop and 80-stamp water-mill are still intact, though the hoisting works were burned soon after the mill was shut down. CYNAS.

Kernville, Oct., 1888.

Mining-Law Suggestions.

EDITORS PRESS:—The interest you are taking in the mineral land question is to be appreciated by every miner of every mining State and Territory. It is an outrage, and not only that, but a serious loss to the nation, this having the mineral lands gobbled up by speculators under agricultural claims. In an article published in the Press of October 13th, you say "it might be expedient that the mineral lands should be open to all citizens at a uniform price, say \$10 per acre." Now I want to know why the miner should be taxed \$10 per acre. The farmer gets his land at \$1.25 per acre. There is a general feeling that the miner should have the heaviest tax possible put on him, and at the same time he is furnishing the blood of trade, commerce, and prosperity of the nation, and the miner takes all the chances of profit. The prospecting miner is really the producer, as he keeps up the supply of the precious metals; but the way the mineral lands are going, there is soon to be a falling off of gold and silver production, from the simple fact the Government is lending its power for fencing the prospecting miner out. Othello's occupation will soon be gone, and then the Government will be crying for gold. One will say the mineral will not be lost by being fenced in in 160 acre tracts, and yet it is, from the fact that the rates put on the lands shut the prospector out. It may be a mark of advanced civilization to thus kill the production of the precious metals—viewing things in that light, I would say Amen; but as long as the world holds to gold as the standard of all values, it certainly is the wiser part for the nation having a mineral domain to foster production, rather than to lend its aid for destroying it. COSMOS.

Shasta Co., October, 1888.

A Bedrock Flume.

The Idaho World says: An Eastern company has secured a large amount of ground in Grimes and Granite creeks which will be worked through bedrock flumes. Arrangements for commencing work this fall are being perfected, as two members of the company who visited the ground are well pleased with it and realize that millions lie covered beneath the sands. The people of the Basin have been hammering away at capitalists for 20 years or more to open up the creek beds by bedrock flumes, and it is a fact for congratulation that some of them have been made to realize that of all industries to be inaugurated, the working of the beds of the creeks will prove most profitable.

As has been repeatedly told, the beds of all the creeks of the Basin were worked when labor was \$7 and \$8 per day, water \$1 per inch, tools, lumber, provisions and everything else proportionately high. From eight to ten feet of top dirt had to be wheeled off at enormous expense so that pay streaks of from one to three feet could be got at. This was shoveled into small, short boxes, through which a good deal of gold passed and was shoveled out in the tailings. Narrow streaks of rich dirt were wheeled off with the strippings, because it would not pay to save it. Nothing but the very richest of ground would pay to work. As soon as the creek beds were hastily run over, the miners of the bars and hillside commenced dumping into them. These tailings all contain gold, and, as they could be rapidly worked through flumes, would pay, not counting the acres of new ground that would pay handsomely now with small boxes if it could be got at.

There is ground enough in Grimes, Granite, Opbir, More and Elk creeks to keep several companies at work for 20 or 30 years, and every one of them would yield millions of money. Of course it requires large capital to start these enterprises, but that matters not, as all who know the ground know that the profits will be beyond those of anything entered into in Idaho Territory heretofore.

We have peculiar advantages here for flume mining. The creeks have good fall, water in sufficient quantities, good roads and timber in abundance. Portable sawmills could easily be moved to any desirable point and lumber cut wherever needed. As soon as the Granite Creek company gets its flumes up to paying ground, which can easily be done by next year, the returns will be so handsome that other companies will immediately secure all the ground in the other creeks, and there will be a revival of all classes of business not witnessed since the bright days of the '60s, when Boise Basin was known far and wide as the great placer-mining district of the West. Ground that has yielded so many millions must contain millions more; and, comparatively speaking, it will require but small capital to get at it. We know this because 10,000 men, most of whom were not practical miners, rushing and hastening to work the best ground, necessarily left a large amount that would be considered very rich to-day, and did not save a very good percentage of that which they did work.

That one company has been formed to work by the flume process is an occasion for rejoicing among our citizens, as others will follow in rapid succession until hundreds of men will be added to our laboring population.

WARDNER'S NEW CONCENTRATOR.—The just completed concentrator of the Spokane Concentrating Co., which has been erected for the concentration of the ore of the Luma and Last Chance mine, started up yesterday, and the run so far has been very successful. The concentrator is located at the head of Main street, Wardner, on Milo creek, right at the base of the Luma and Last Chance mine, with which it is connected by a substantial tramway, on the same principle as that used in the Banker Hill and Sullivan mine, and with a capacity of 288 tons per day of 24 hours. The concentrator is a perfect piece of mechanism, substantially built, and designed so that it can with small additional cost be increased as the output of the mine justifies. It is built on the most approved plan, and its present capacity in ore is about 40 tons per diem. The tramway is some 1800 feet in length, the vertical height to the level of Tunnel No. 1 being 800 feet. The cars used have capacity for a ton of ore, the ore being deposited in a series of hives at the summit of the concentrator, from which it passes through the various processes of concentration, coming out ready for sacking on the loading platform at the base of the building. The clearing for the site of the concentrator and tramway was commenced on July 20th, and the first timber was laid on the lot of August. The whole work has thus been completed in 50 days—by far the quickest piece of concentrator building-work so far accomplished in the Coeur d'Alenes. The machinery of the concentrator and the tramway was supplied by the well-known house of Frazer & Chalmers of Chicago. Mr. A. M. Esler superintended construction and was ably assisted by his assistant, W. Richard O'Neil. The lumber contract was executed by the Cameron Bros. of the Milo sawmills.—*Spokane Falls Review*.

SILVER IN ALASKA.—The Alaska Free Press says: It begins to look as though Alaska would soon come into prominence as a silver-bearing region. It is known that the Copper River country contains rich silver ores, as well as cop-

per. Glacier Bay has her silver deposits, although as yet undeveloped, and now a little development work on Sheep creek shows up good veins of silver ore. This is one of the best indications that go to show up a permanent mineral-producing region. At no time since the first discoveries of mineral here has the mining outlook been as propitious as at the present time. One of the weaknesses of our old-time prospectors has been romance of rich placer digging and ores yellow with gold existing in inaccessible places, and to search for these they have discarded development work on promising claims, simply because a fortune was not visible on the surface, and have overlooked ground near at home because they thought it too accessible to pan out well. But these accessible places are now being prospected and development work going on on prospects that were heretofore classed as worthless, and some rich strikes are being made.

An Asbestos Bonanza

In the Mohave country has recently been discovered the largest and most valuable deposit of asbestos in the known world. Alex J. Trueman, who a day or two ago arrived from the Mohave country, passing up along the proposed line of the Carson & Colorado extension from Keeler to Mohave, is enthusiastic in regard to the mineral resources of what has heretofore been looked upon as a region worthless, except for its deposits of borax, soda, salt and like surface wealth. Mr. Trueman says the asbestos recently discovered near Oro Grande is as fine as has been found in any place in the world, while the amount of the mineral in sight in the vein far exceeds that to be seen in any other known locality. The vein is about 25 feet in width and lies in plain sight for a distance of over 1500 feet. It is traceable for over 3000 feet by means of croppings that occasionally come to the surface.

Unlike many other asbestos deposits, this vein is almost unmined with hornblende and tremolite. The fibers are long, silky and of a beautiful pearly luster. The fibers are as tough as flax, and might easily be spun into a fine thread. In short, it is the genuine amiantus of the Greeks. Asbestos is a Greek word, which means indestructible, and amiantus (also Greek) signifies unpalatable. In this word—unpalatable—we have a hint of the use to which the mineral was put. By the Greeks the amiantus was woven into cloth in which were enveloped human bodies that were to be cremated. Thus they preserved in the folds of the "indestructible" and "unpalatable" cloth the ashes of their dead friends, free from admixture with the cinders and ashes of the fuel used in the process of cremation. From the asbestos of Mohave might be woven the same indestructible cloth. This is of interest to many at this time, as cremation of the dead is again beginning to be practiced.

Besides this fine silken article which occupies the central parts of the vein there are outside (as a sort of wall rock) great bodies of what is called rock cork (which is a variety of asbestos that is as easily cut and as light as ordinary cork, readily floating in water), "rock-heaters" and "rock wood," which are very similar to the rock cork. In the vein and along its borders are inexhaustible quantities of ordinary asbestos, such as is used in crating steam pipes and the like. The amiantus meanders through the gorges natural in veins from one to four feet in width. It can be torn out with the naked hands in "banks" over a yard in length, and just as taken out is superior to the best prepared article from Tarentaise in Savoy. All about the lode the country rock is made the less asbestiform.

That which will probably be of great use to our furnace men in their smelters is the fine talc which is found in the same neighborhood in immense quantities and of all varieties. Talc is able to stand the strongest fires without injury. Mixed with asbestos there might be manufactured from the talc excellent melting-pots and fire-bricks. When the Carson & Colorado taps the Mohave country we may easily and cheaply obtain a supply of hot talc and asbestos.—*Virginia Enterprise*.

CENTER OF THE UNITED STATES.—Very few people know where the center of the United States, east and west, is. It is scarcely half a degree east of San Francisco. People have always thought of San Francisco as on the very remote western edge of the United States, and yet Alaska, which is a part of the United States, extends within a trifling fraction of so many degrees west of San Francisco as San Francisco is west of Portland, Me. It extends within 40 miles of Asia.

MEXICAN COAL.—The Southern Pacific Company is experimenting on the southern divisions of its system with Mexican coal, which, if satisfactory, will result in a largely increased consumption of that article. It has hitherto been considered inferior for engine use. New grades adapted to this particular kind of coal will have to be provided.

THE EXCHEQUER Mining Company has elected the following officers for the ensuing year: Chas. Hirschfeld, Pres.; M. Rehfsch, Vice-Pres.; W. S. Hobart, Max Jaffe and C. F. Smyth, Directors. C. E. Elliot was re-elected Secretary and A. C. Hamilton Superintendent.

Seven Devils.

We hope our friends will not be unduly startled at the announcement of our topic. This is not a ghost story or hallucination, but real fact.

In the course of human events, about the last of August, it became our lot by choice to go within about four miles of the oft-heard-of monsters. And it is truly an august presence even at that distance. They consist of seven or more irregularly defined mountain peaks erected upon the same base, of nearly uniform height, grouped within a radius of about 15 miles, frowning and rough beyond verbal description.

Going in by way of Indian creek these points cannot be seen until we have mounted the last ridge, which is itself 8000 feet high, and about four miles on an air line from the rocky sides of the Seven Devils proper. Here the queering beholder is confronted with grandeur, the occasion for which Dame Nature refuses as yet the slightest comment.

The beginning of the copper mining district is about five miles south from the Seven Devils. Here we have unfathomable deposits of copper ore, averaging over 75 per cent pure copper and carrying a small amount of gold. Passing up the wooded canyon from Indian creek we come to the Alaska, Copper Crescent, Blue Jacket and other mines located in the timber. These openings reveal undefined ledges which now belong to Brisson & Blake of Montana.

Mounting from this above timber line we pass several prospects, and after a journey of three miles north along the ridge parallel with Snake river, we come to the famous Peacock and South Peacock mines where shafts have been sunk 30 and 35 feet into the beds of ore. Just under the bill is a gold placer owned by Chas. Walker, which yields from \$5 to \$8 per day. Now turning to the east and going over the ridge a distance of two miles, we come to the Mountain Chief, where a ledge was opened in July last. From this point east across the gulch, a distance of one-half mile, is the Copper King, where another entirely different body of ore is found. Southeast one-half mile is the Humboldt, where a ledge was struck in August.

About four miles northeast is French Ledge, Placer Basin and the new discovery made by James Ruth in the early part of the summer. From the discoveries already made, their relative locations, and the fact that the country is not fully prospected we are impressed with the conviction that the Seven Devils mining district will ere long become one of the most extensive mining districts in the world.

AMERICAN NEWSPAPER ANNUAL.—The ninth annual edition of N. W. Ayer & Son's Newspaper Annual has just reached us from Philadelphia—a welcome arrival. Turning over its well-ordered and neatly printed pages, we can easily believe the publishers' avowal that, in its preparation, every endeavor has been made to render it more valuable than either of the preceding volumes, as a ready reference-book on all statistics pertaining to the newspaper press. An important change has been made in this edition, in the arrangement of the States. Hitherto the States have been grouped in geographical sections, and notwithstanding they still believe this to be the most convenient for advertisers, the publishers have been induced by the suggestion of many patrons, and particularly by the fact that the Annual is now largely used as a book of reference by those accustomed to an alphabetical arrangement, to adopt that plan. In its present form it furnishes not merely a comprehensive and accurately compiled newspaper directory, but also a gazetteer of condensed information relative to the topography of the country, and its agricultural, mining, manufacturing and commercial resources. It makes a fine royal octavo of 1072 pages, costing \$5. We have found the editions of former years very handy and helpful, and expect to enjoy a like experience with that of 1888.

STANFORD UNIVERSITY.—Eight of the buildings at the Stanford, Jr., University, are finished by the masons and are now being roofed with tile. The smokestack, 150 feet high, erected at the engine-house and machine-shop, is a landmark for miles around. The whole series of stone arches forming the south corridor and also three massive arches composing the chapel entrance are also completed. A portion of the ground is being cleared up and graded preparatory to being laid out by landscape gardeners this winter. Concrete foundations have been laid on the north line of the quadrangle for six more buildings, and two other buildings necessary to complete the ends of the quadrangle are well under course of construction. The Stanford mausoleum, now being erected on the Palo Alto estate, begins to assume shape. The exterior is of a rich-colored blue granite, while the interior will be lined with white marble. On a massive block of granite forming the archway to the entrance are inscribed the names of Leland Stanford, Jane L. Stanford, Leland Stanford, Jr.—*Redwood Times and Gazette*.

The mica mine at Tres Pintas, New Mexico, is said to contain the largest deposit of that mineral in the world. A factory is to be established in Denver, Col., for pulverizing mica. The substance is now used in the manufacture of wall-papers.

The Russell Process.

Its Practical Application and Economic Results.

(Concluded from our last.)

c. At the Marsaac Mill (Daly Ore), Park City, Utah.—Table XLII gives all the mill tests so far made in the series of experiments now being conducted by Mr. W. A. Wilson, superintendent of the Marsaac mill, to test the applicability of the Russell process to the ore treated in that mill. In all cases the ore was roasted for amalgamation—not for leaching. If the ore had been roasted with reference to the Russell process, the results by that process would probably have been 2 to 5

TABLE XLII.

COMPARISON OF THE RUSSELL PROCESS WITH AMALGAMATION AT THE MARSAAC MILL, PARK CITY, UTAH, IN 1887, ON "DALY" ORE ROASTED FOR AMALGAMATION.

No. of Mill-run.	Total Time Covered by Mill-Run.	Value of Ore, per Ton.	Size of Screen Used.	Per cent of Salt Used.	Per cent Extracted by Ordinary Process in Mill.	Per cent Extracted by Russell Process in Mill.	Per cent Extracted by Amalgamation in Mill.	Per cent Extracted by Extra Leaching.	Per cent Extracted by Extra Leaching in Assay Office.	Per cent Extracted by Extra Leaching in Assay Office.
1	33.22	20	10	93.4	94.4	90.0	88.9			
2	35.43	20	10	97.2	91.0	90.7	88.6			
3	43.03	20	10	80.9	91.2	89.9	87.5			
4	40.74	29	10	88.8	90.8	89.0	86.6			
5	38.87	20	10	89.4	91.6	90.7	89.1			
6	33.34	20	10	80.9	83.9	89.6	86.6			
7	40.37	20	10	88.9	90.9	90.5	90.3			
8	42.32	20	10	87.1	91.0	93.5	90.8			
9	35.94	20	9	88.5	90.7	92.3	90.9			
10	40.13	20	10	88.9	90.6	89.8	91.8			
11	39.07	20	12	89.4	91.6	89.9	91.0			
Averages.				88.9	91.1	90.6	89.2			

per cent higher. The weight of ore used in the leaching charges was 2 tons; and in those for amalgamation 1.5 tons each. The amount of water used in amalgamation is 7 to 8 times the amount used in leaching. The comparison in expenses has not been made; but the Marsaac mill expenses are about \$11, and the difference will probably be \$4 to \$6 (see table) in favor of the Russell process, the ore being a simple alkaline ore and requiring only a small amount of chemicals. Experiments are now being made with less salt and coarser screens for the leaching tests, a 20-mesh screen and 10 per cent of salt being the least which can be used for ore to be treated by amalgamation.

d. At the Ontario in 1887-1888.—Table XLIII gives all the mill tests so far made in the series of experiments now being made similar to those in the Marsaac mill on Daly ore. These tests also are being conducted by Mr. Wilson to determine the applicability of the Russell process to the Ontario ore. In all tests, the crushing, the percentage of salt used,

TABLE XLIII.

COMPARISON OF THE RUSSELL PROCESS WITH AMALGAMATION AT THE ONTARIO MILL, PARK CITY, UTAH, IN 1887, ON ONTARIO ORE, ROASTED FOR AMALGAMATION.

No. of Mill-run.	Total Time Covered by Mill-Run.	Value of Ore, per Ton.	Size of Screen Used.	Per cent of Salt Used.	Per cent Extracted by Ordinary Process in Mill.	Per cent Extracted by Russell Process in Mill.	Per cent Extracted by Amalgamation in Mill.	Per cent Extracted by Extra Leaching.	Per cent Extracted by Extra Leaching in Assay Office.	Per cent Extracted by Extra Leaching in Assay Office.
1	55.78	26	11	91.6	91.8	73.6	91.8			
2	40.28	26	11	83.8	91.9	71.3	92.1			
3	36.40	26	13	91.9	94.1	76.5	86.3			
4	43.72	26	14	93.1	94.2	86.3	89.5			
5	37.06	26	13	93.8	94.4	89.6	94.9			
6	39.08	26	12	87.1	91.8	81.1	90.8			
7	43.50	26	12	89.5	92.2	89.6	91.3			
8	51.40	26	14	88.9	89.9	86.8	89.2			
9	43.10	26	15	79.0	91.4	76.6	90.6			
10	48.10	26	16	94.0	95.9	81.8	95.1			
11	52.90	26	15	93.8	94.2	91.3	94.8			
Averages.	43.76			89.2	92.9	82.1	91.6			

and the roasting are fixed with reference to obtaining the best possible results by amalgamation, and not at all with reference to the leaching. Nevertheless, the mill extraction by the Russell process averages 9.4 per cent of the value of the ore above the results of amalgamation. The weight of each leaching charge was 2 tons, and that of each amalgamation charge about 1.5 tons. The Ontario ore has always required about three times as much water for leaching as any other roasted ore, but still the amount of water used in amalgamation for Ontario ore is 2.7 times that required for leaching the same ore. On all other roasted ores, the amount of water required for amalgamation averages 16 times that used in leaching. The Ontario mill expenses are about \$13 per ton. Those for leaching would be about \$5 to \$6 less, or a difference in favor of the Russell process of \$5 to \$6 in expenses, which, together with the additional extraction of 4.11 ounces, makes a total net difference of \$9 to \$10 per ton.

For January, as in December, the experimental plant at the Ontario mill was run by Mr. Wilson on Ontario ore alone, it not being considered advisable to run the plant on both Ontario and Daly ore at the same time. The following statement gives the average results for January, 1888, by the Russell process and by amalgamation:

Extracted by:	Per cent.
Ordinary in assay office.....	32.1
Extra solution in assay office.....	33.8
Russell process in mill.....	33.0
Amalgamation in mill.....	33.1

The following statement shows the compari-

son between the extraction by the ordinary solution in the assay office, and that by amalgamation in the mill, for the last ten days in January:

	Per cent.
Ordinary solution in assay office.....	32.0
Amalgamation in mill.....	33.1

The best results by the Russell process on Ontario ore were obtained while using a stock solution of about 1.5 per cent hyposulphite, at a temperature of 90° to 120° F., and with an extra solution of about the same temperature, and using about 6½ pounds of bluestone per ton. The weight of charge treated was 2 tons. The depth of the dry charge before leaching was 24 inches, and after leaching 18 inches. For 2 tons of Daly ore, the depth is 22 inches, and after leaching 16 inches. The temperatures of the solutions are the same as for Ontario ore; but the amount of bluestone used is only 4½ pounds per ton. Although both Ontario and Daly ore yield an alkaline first wash-water, the extra solution can be circulated (and usually is), as if they yielded an acid first wash-water. The amount of gold extracted by the Russell process from both Ontario and Daly ore is the same as by amalgamation. The amount of gold in the ore is, however, quite small, amounting to only about 0.1 ounce per ton for shipping ore and probably about one-half that amount for milling ore.

e. At Cusiuhiric, Chihuahua, Mexico.—Table XLIV gives the comparison in mill results, both in apparent and actual extraction,

Name of ore treated.		Mesh of screen used.		Per cent of salt.		Value of ore, Oz. silver per ton.		Per cent of salts soluble in water.		Per cent by ordinary in assay office.		Per cent by extra in assay office.		Number of tons treated.		Apparent extraction in mill. Per cent.		Actual extraction in mill. Per cent.		By which process.	
San Miguel.....	26	10	10	83.08	0.630	0.91.9	60.87	0.630	0.91.9	60.87	0.630	0.91.9	60.87	0.630	0.91.9	60.87	0.630	0.91.9	60.87	0.630	0.91.9
San Antonio and San Bartolo.....	50	10	10	46.30	10.635	0.80.2	60.86	3.79	6. Amalgamation.	60.86	3.79	6. Amalgamation.	60.86	3.79	6. Amalgamation.	60.86	3.79	6. Amalgamation.	60.86	3.79	6. Amalgamation.

between the Russell process and amalgamation. The ore for each test was weighed with the utmost care. In this case also, the crushing, use of salt, and the roasting were conducted solely with reference to obtaining the best results by amalgamation. The results showed, in the case of amalgamation, a discrepancy between the apparent and the actual extraction, the actual extractions being 6.7 per cent less than the apparent. The results of leaching, on the other hand, showed a plus discrepancy, the actual extraction averaging 2.2 per cent more than the apparent. The comparison in actual extraction in silver is in favor of the Russell process by 11.4 per cent of the value of the ore,

TABLE XLV.

COMPARISON OF THE RUSSELL PROCESS WITH AMALGAMATION AND WITH COMBINED AMALGAMATION AND CONCENTRATION AT THE BIG SANDY MILL, ARIZONA.

Description of run.		Number of run.		Value of silver per ton.		Per cent extraction by concentration.		Per cent extraction by amalgamation.		Total mill extraction, per cent.		Per cent extraction by ordinary in assay office.		Per cent extraction by extra in assay office.	
I.	4 days run without chemicals.	1	21.8	28.7	53.3	54.0	50.5	53.1	52.5	53.1	50.5	53.1	50.5	53.1	50.5
II.	3 days run with chemicals.	1	21.8	28.7	53.3	54.0	50.5	53.1	52.5	53.1	50.5	53.1	50.5	53.1	50.5
III.	6 days run with chemicals.	1	21.8	28.7	53.3	54.0	50.5	53.1	52.5	53.1	50.5	53.1	50.5	53.1	50.5
IV.	3 days run with chemicals.	1	21.8	28.7	53.3	54.0	50.5	53.1	52.5	53.1	50.5	53.1	50.5	53.1	50.5
V.	4 days run with chemicals.	1	21.8	28.7	53.3	54.0	50.5	53.1	52.5	53.1	50.5	53.1	50.5	53.1	50.5
No leaching tests made.															

or 5.7 ounces per ton. The difference in expenses between the Russell process and amalgamation is less for Cusi than for most other ores, being about \$2.50 per ton in favor of the leaching, making a total net difference of over \$8 per ton in favor of the Russell process.

C. Comparison Between the Russell Process and Combined Amalgamation and Concentration.

All the foregoing comparisons have been based on mill results. On the ore referred to

in Table XLV, the data for which were furnished by Mr. G. J. Rockwell, no tests have yet been made on the large scale by the extra solution, hence the comparison is between mill results by amalgamation and concentration, on the one hand, and assay-office results by the Russell process on the other. The previous comparisons have been on roasted ore, but this is on raw ore. As no difficulty has been experienced elsewhere in obtaining as good results (within 2 to 3 per cent) in the mill as in the assay office on raw ore by the extra solution, there is no reason to expect any in this case. Table XLV shows in Run I a difference in favor of the Russell process of 53.5 per cent of the value of the ore as compared with the Boss process, and of 34.8 per cent of the value of the ore as compared with the combined Boss process and concentration. In Run II no leaching tests by extra solution were made. In Run III, the difference is in favor of the leaching as compared with the Boss process by 39.6 per cent of the value of the ore, and 38.3 per cent as compared with the combined Boss process and concentration. Run IV shows in favor of the Russell process 43 per cent when compared with concentration, or 35.4 per cent compared with concentration and Boss process combined. The average difference in assay-office results by the ordinary and extra solutions is in favor of the extra solution by 38 per cent of the value of the ore. Here also, as has been noted in the case of roasted ore, the amalgamation results agree closely with the results by the ordinary solution.

D. Relation of the Mill Results Obtained by Amalgamation, and those by the Russell Process, to the Results Obtained in the Assay Office by the Ordinary and Extra Solutions.

In making the comparisons between the mill results by amalgamation and by the Russell process, the relations of the former to the ordinary and of the latter to the extra in the assay office, have been noted. Table XLVI gives the results of millruns on five different kinds of ore by amalgamation and by the Russell process, and the corresponding assay-office results by the ordinary and extra. The extractions from San Antonio and San Miguel are actual cleanups in the mill, the others being apparent extractions in the mill. The

TABLE XLVI.

RELATION OF MILL RESULTS BY AMALGAMATION AND RUSSELL PROCESS TO THE ASSAY OFFICE RESULTS BY THE ORDINARY AND EXTRA SOLUTIONS.

Name of ore.		Percent extracted by ordinary in assay office.		Percent extracted by extra in assay office.		Percent extracted by amalgamation in mill.		Percent extracted by Russell process in mill.	
Lake Valley.....	71.9	81.5	79.6	83.9					
San Antonio and San Bartolo.....	85.0	89.2	79.6	91.5					
San Miguel.....	89.0	91.9	80.8	91.8					
Daly.....	88.9	91.1	90.6	89.2					
Ontario.....	89.2	92.9	82.1	91.6					
Average.....	84.6	89.3	80.7	89.4					

mill results by amalgamation average 80.7 per cent, which is 3.9 per cent below the ordinary in the assay office. On the other hand, the mill results by the Russell process average 89.4 per cent, or 0.1 per cent above the extra solution in the assay office, and 8.7 per cent above amalgamation in the mill. These results indicate that amalgamation results on roasted ore are almost as dependent on a good chloridizing roast as is the ordinary leaching process. But the Russell process, on the contrary, may be entirely independent of it.

VIII. Summary, Being a General Comparison of the Russell Process with the Ordinary Leaching Process, and with Amalgamation.

A.—With the Ordinary Leaching Process.—1. The Russell process permits a coarser crushing of the ore.

2. It requires a less careful chloridizing roasting. Hence less salt, and sometimes no salt, need be used.

3. The roasting may be accomplished in a suitable furnace almost instantly; but the roasting for the ordinary process requires time.

4. The results obtainable by the ordinary process are dependent upon a good chloridizing roast, while the Russell process is sometimes entirely independent of the chloridization, and always exceeds in extraction the amount actually chloridized.

5. The extra solution allows a much more systematic leaching and gives more regular results.

6. The results by the extra solution are not affected by the presence of caustic alkali in the ore or solution, while even minute quantities affect very powerfully the results by the ordinary process.

7. The Russell process is much more applicable to ores containing lime or lead.

8. It produces sulphides free from lead, and the lead as a by-product.

9. From raw ores it extracts often two to ten times as much as can be extracted by the ordinary solution.

10. Hence, ores which would require chloridizing for treatment by the ordinary process

can often be treated raw by the Russell process, thus allowing the erection of a cheaper plant and saving the additional expense and losses incident to chloridizing.

B.—With Amalgamation.—1. The cost of plant for the Russell process is much less than that for amalgamation.

2. It permits a much coarser crushing of the ore, the size required for amalgamation being rarely less than a 26-mesh and usually a 30-mesh screen, while leaching, on the other hand, requires only an 8 to 16 mesh screen.

3. The results of amalgamation are closely dependent upon a good chloridizing roast, while the Russell process is often independent of it.

4. Hence a less careful roasting is required, and therefore less, and sometimes no, salt.

5. The roasting for amalgamation requires time, while that for the extra solution can be accomplished almost instantly.

6. The extraction in the mill by the Russell process is almost always higher, and the expenses are always less, than by amalgamation.

7. Raw ores that can be successfully treated by amalgamation yield a higher percentage by the extra solution (except Silver Reef) and always at less expense.

8. The Russell process permits the extraction, from roasted ore, of copper and lead as valuable by-products.

9. It is not injurious to the laborers' health, as is apt to be the case with amalgamation.

10. It extracts compounds of silver which are not attacked by amalgamation.

11. It requires no machinery in the leaching, and no moving parts, except a single pump.

12. The charges treated are from 10 to 30 times the size of those treated by amalgamation.

13. The amount of water required for roasted ore averages only one-sixth, and for raw ore only one-thirtieth, of that required for amalgamation.

14. In large mills, the quantity of quicksilver in circulation represents a capital of \$30,000 to \$40,000, which is more than 150 times the cost of the stock solution for the Russell process.

(Concluded.)

A Good Cement.

Very often a form of cement is required around shops and mills for filling cracks in stone and brick work. New factories, especially, often develop awkward cracks between the window frames and the brick walls, and during the cold months the air entering here will largely reduce the coal pile.

Pronoe a lot of paint, old paint if possible, from a dealer; the skins forming on top of the paints, settlings from the bottom of paint pots, and, in fact, any refuse which contains oil, zinc, or other mineral body, may be used for the purpose.

Reduce this mass, especially if hardened from continued standing exposed to air, to the consistency of cream by soaking in some cheap oil. Heating may be resorted to if the hard paints cannot otherwise be softened.

When the whole has become soft enough to be stirred into a homogeneous mass, more oil may be added, and the whole worked through a sieve, and then run through an ordinary paint-mill.

A quantity of common whitening is next to be worked into the oil and paint, much in the way as when ordinary putty is to be made. The thickness of this putty, as we may now call it, should not be as dense as when used for glazing.

When the whitening has been thoroughly mixed in and the mass well worked over, add a quantity of good Portland cement sufficient to bring the putty to a consistency which will enable it to be handled readily.

When in this state the putty may be worked into cracks in brick or stone work much as ordinary putty is used when allowed to set and harden, and it will become nearly as hard as iron, impervious to moisture and any reasonable degree of heat.—The Miller.

How to Keep Tools.—A machinist says: Keep your tools handy and in good condition. Every tool should have its exact place and should always be kept there when not in use. Having a chest or any receptacle, with a lot of tools thrown into it promiscuously, is just as bad as putting the notes into an organ without regard to their proper place. If a man wants a wrench, obisel or hammer, it's somewhere in the box or chest, or somewhere else, and the search begins. Sometimes it is found, perhaps sharp, perhaps dull, may be broken, and by the time it is found he has spent time enough to pay for several tools of the kind wanted. That habit of throwing every tool down, anyhow, in any way, or any place, is one of the most detestable habits a man can possibly get into. It is only a matter of habit to correct this. It may take a moment more to lay a tool up carefully after using, but the time is more than equalized when you want to use it again, and so it is time saved. Habits, either good or bad, go a long way in their influence on men's lives. Keeping tools in good order, and ready to use, is as necessary as keeping in the proper place. To take up a dull saw or dull chisel, and try to do any kind of work with it, is worse than pulling a boat with a broom, and it all comes from throwing down tools carelessly—habit. To say you have no time to sharpen is worse than outright lying, for if you have time to use a dull tool, you have time to put it in good order.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW LONDON.—*Dispatch*, Oct. 27: At this mine they are drifting north and south from the 1250-foot level. About 2000 tons of paying ore is on the dump pile. The mine is being worked in a thorough and systematic manner by Humphrey Reese.

CHICAGO.—This property is located about half a mile east of the New London. It is owned by Mr. John Cupps. Owing to a hitch in the management, it has been shut down for some time, but last week was started up with renewed vigor. The water is now being taken out.

CRAIN.—The rich deposit struck by A. J. Crain on his place four miles above Plymouth, holds out well.

DOYLE.—It is said the scheme to boom this property has fallen through.

REED & ASKEY.—The new mill being erected at this mine is nearly completed. It is expected to be in running trim by the 10th of next month. It will be a 10-stamper, with two concentrators. The mine is worked by two tunnels; the north tunnel is in 300 feet and the south tunnel 500 feet. A crushing will be had as soon as practicable.

Calaveras.

RUNNING.—*Calaveras Chronicle*, Oct. 27: Since resuming operations at the A & B mine, which was shut during a portion of the summer months, owing to a scarcity of water, the shaft has been pumped out and the mine is now running with a full force of workmen.

UTICA.—*Mountain Echo*, Oct. 27: Extensive work is being accomplished on the surface at the Utica mine in this town. The new mill is now under way, and other improvements are being made. The new works will be the largest and most expensive of any in southern mines.

NEVILLS.—An immense pile of lumber is lying in front of the Nevills Hoisting Works which is to be used for timbering from the 400-foot level down, as soon as they commence sinking, which will be in a short time. The Nevills mine is destined to be the leading gold-producer of Calaveras county.

El Dorado.

REOPENED.—*Placerville Observer*, Oct. 30: We were shown some ore taken from the Bobby Burns mine, situated eight miles east of this city, the other day, the sight of which was good for sore eyes. This mine, which has lain idle for 25 years, was opened up about four weeks ago, and the prospects referred to are most encouraging to the owners, the Blair brothers, Tom Alderson, Tom Stephens and Mr. Williamson. They are drifting at a depth of 50 feet, and have a five-foot ledge.

Los Angeles.

MINING AROUND ACTON.—*Newhall Times*, Oct. 27: The Red Rover mine is about three miles northwest of Acton, and is owned principally by E. B. Miller of Los Angeles, with W. A. Roberts as superintendent. The mine was worked a great many years ago by Mexicans, and some extensive tunneling was accomplished, but it was finally abandoned and laid inactive for a number of years. Finally the present owners got possession of it and have been working good paying rock for quite a time. The body of ore is quite wide, with free gold, and pans out from \$12 to \$75 per ton. A shaft 230 feet deep was sunk on the lead and about 2000 tons of good ore were put on the dump. Operations ceased on account of the water coming into the mine, and the work on this line was stopped for awhile. The ore has been worked, but the dump is now down to about half its former size and will be worked out before the winter is over. Another shaft, the same depth as the above, has been sunk on the vein about 150 feet from the first one, and it is the intention to run crosscuts and take out the ore above the waterline. It is expected that considerable new machinery will be purchased, and that a large force of men will be kept at work this winter. The mine is a good paying one, and when developed will be a dandy.

GOOD ASSAYS.—John Green's mine, the Old Padre, has shown assays of \$750 per ton, and this only on what might be called surface rock. He is sinking shafts and running tunnels, and has a good dump. A party of capitalists offered \$30,000 for it, but Green said it was worth more to him and kept it. John Reiley has a five-stamp mill at his New York mine, and is running on good rock.

Mariposa.

AROUND COULTERVILLE.—*Mariposa News*, Oct. 26: The prospectors south and east of here are striking pockets all the time varying from 20 to 100 ounces. W. B. Stolder & Co. have struck a good pocket on the old Dave Lewis on Scotts gulch and have taken out considerable money. The Red Cloud is doing well. The supply of water is only sufficient to run one mill in the daytime. The ore crushed is paying well, averaging \$60 a ton. This ore is coming from a drift that is being run for the purpose of getting under the pay chute, where they expect to do better. Our mining interests are on the improve, as recent facts show. The old Virginia mine has been bonded by Col. Crook of Big Oak Flat, who is reported as representing a New York syndicate. He is going to thoroughly develop the property. Material is now being ordered for substantial hoisting works. The Bonduant Hathaway mine still stands at the head. They are preparing to put on good substantial hoisting works which will enable them to go down to an indefinite depth. The ore is very good. This company is negotiating for the purchase of the Rud mine on the north fork of the Merced, which is supposed to be a continuation of the Bonduant vein.

Monterey.

LOS BURROS.—*Monterey Democrat*, Oct. 20: Mr. Hackworth of Jolon was in Salinas Thursday. From him we learn that Mr. Cruikshank has struck three ledges in the tunnel he has been putting in the side-hill since March last. The tunnel is now in about 300 feet and the work is being pushed for other ledges in sight above on the surface. One of the

ledges struck was about eight inches between walls, and the other two about a foot between walls, while the one in view is expected to measure five feet. All these ledges are extremely rich in gold. Appearances indicate a strike soon in the King mine. The road to the coast from the mines has been used, but it is not very good. What the camp wants is a good road from Jolon to the mines.

Nevada.

SHOWING UP WELL.—*Grass Valley Union*, Oct. 25: The new ledge in the Empire, recently struck by crosscutting into the footwall from the 17th level, is showing up finely. A drift has been run on it a distance of 50 feet, and the ledge is now 18 inches in size and prospects well in free gold. The depth at which this fine-appearing ledge has been found gives great encouragement as to future results, as there is no doubt felt that it extends up to the 11th level, and that it will hold in depth. The Empire has a long life before it.

NEW MILL FOR THE PITTSBURG MINE.—*Grass Valley Union*, Oct. 28: George G. Allan of Nevada City has obtained the contract for the building of the new ten-stamp mill of the Pittsburg Mining Co. This mill will have all the latest improvements, and when completed will not be surpassed by any mill of the same capacity in the State. Ground will be broken for the mill about the 10th of November, and the work will be completed inside of 90 days. In the meanwhile the underground work of the mine will be advanced by sinking the shaft for the tenth level, and extending the drifts and stopes. The Pittsburg is looking finely.

ROUGH AND READY.—*Cor. Nevada Herald*, Oct. 25: Work has been resumed on the Pinco ledge, which lies about three-fourths of a mile west of town. This ledge was prospected about a year ago by its owners, until their capital was exhausted, when they were obliged to suspend operations and go to work to earn the funds necessary to prosecute the work. They let a contract to two miners a few days ago to sink the shaft down to water level on the ledge, and work was begun this week. The ledge is about a foot thick and the rock looks well. The ledge about a mile west of town, near the old Colliis place, owned by T. J. Waggoner and others, is being reopened, after lying idle for nearly a quarter of a century, and it is thought, from two samples of rock taken out and pounded up in a band mortar, that the rock will yield from \$30 to \$40 a ton.

REDUCING THE FORCE.—*Herald*, Oct. 30: The Washington mine, located at Ormonde, discharged several of its employees last week and they have returned to this city. The crew of men will be smaller during the winter, but will probably be increased again in the spring.

Placer.

LAST CHANCE.—*Placer Herald*, Oct. 27: The quartz-mining industry is looking up in the Last Chance district. W. D. Perkins and W. D. Tuddsbury own the Star mine, which prospects very well. The ledge is six feet thick. A. H. Morrell is doing the prospect work. Loonis & Goolsby are sinking a shaft on the Leopold mine. Prospecting is being done on several other mines in the vicinity.

Plumas.

THE CRESCENT.—*Greenville Bulletin*, Oct. 24: The Crescent mine is now employing about 45 men in extracting ore and doing development work. Everything about the mine has a lively yet orderly appearance. Sixteen stamps are running constantly on ore from the Pet vein. During the last five months the mine has more than paid expenses, and the amount expended on the property up to that time, under Supt. Whitney's management, is being rapidly reduced.

San Diego.

GOLD AND THE REDUCTION WORKS.—*National City Record*, Oct. 25: The placing of machinery in the Reduction Works is going on as rapidly as can be expected, and the sampling works will soon be in running order. The working of the ground continues with good results, and the fact has been established that there is gold there. As soon as it is found in paying quantities, the fact will be announced. Mr. H. N. Bryant, who is making an excavation at his house, has encountered the same formation, and to satisfy his curiosity will make a test of the dirt, which is nearly as hard as rock.

Shasta.

SQUAW CREEK.—*Democrat*, Oct. 24: Our reporter visited the Squaw creek mines last Saturday and Sunday. He found the camp livelier than usual. Twelve men are employed on the Clipper and 20 on the Snyder. Both these mines were lately sold to companies who are now preparing to erect a mill on each property. Lee Fader has taken the contract to haul in the machinery, lumber, etc., for the Snyder, and is now at work on the job. Last Saturday Jack Conant brought out another \$5000 brick from the Uccle Sam. There is considerable new property on virgin ground and quite an amount of work is being done. Taking it altogether, Squaw creek is just now a very lively camp.

THE BUTTERS ORE MILLING WORKS.—These works at Kennett will be ready for business in about a month. The lixiviation and chlorination plant will be first started up, and early next spring a crushing plant will be added, then the works will be complete. The Calumet mill started up with its grand water-power on the 16th inst., and is running night and day. It was made known on the streets last Monday evening that Jack Conant had sold his mines on Squaw creek for \$150,000. The sale had been pending for some months.

Sierra.

FROM OVER NORTH.—*Cor. Sierra Tribune*, Oct. 26: Watin Prosser is expected back from San Francisco with Mr. Homsey and capitalists who intend to purchase the whole Port Wine ridge, having bonded already numerous claims at Scales and Fair Play, one being of a Chinese company for \$25,000. The Bella Union Co., near the Lucky Hill mine, is progressing finely with their bedrock tunnel. The Lucky Hill tunnel is already in 350 feet. They intend to put up a Burrell drill after the mine has been incorporated. The Union Consolidated Co. in Happy Hollow is now over 2200 feet in with their lower tunnel, which is several hundred feet below their old upper tunnel that was 600 feet long, at the back end of which the company prospected first by running an incline down over 1000 feet, and in which they found immensely rich dirt. Lately this incline was tapped by the lower tunnel five feet in

bedrock. They are driving the main tunnel ahead toward Grass Flat. At the same time they are making a double track for the cars to pass each other at the bottom of the incline. Mr. Trizel, who is the general manager and superintendent, has run said 2200 feet of a hard bedrock tunnel in less than 11 months. He is now baving his wash flumes made, and will soon be taking out as rich gravel as was ever taken out of any mine in Northern Sierra. The adjoining Pioocer has yielded prospects as much as \$200 to a pan of gravel from the richest part of the channel, and took out over \$400,000 from a small area of ground by hydraulic process. The Riffe Co. has finished all their new buildings, and are driving their upper tunnel toward the channel before them. At the Comet, owned by the Treasure brothers, and situated between the Excelsior and Riffe claims, they are running a bedrock tunnel, and expect soon to reach the same channel which yielded so rich in former years in Cedar Grove. At Cedar Grove is the Excelsior Drift G. M. Co. working quietly away in their bedrock tunnel, which we are informed is now 678 feet under ground. Their last 100 feet of tunnel was very hard rock. For awhile four men were only able to make three feet a day with No. 1 giant powder. The Caledonia boys are taking out good gravel near the Excelsior line, and are working under great disadvantages. Above the Caledonia are the Clipper-Ship, Home Star and Constitution claims, all running tunnels for the channel. Above these claims are the California and Table Rock claims, which have lately gotten into rich pay on the channel. At Pine Grove, Messrs. George Cox and T. Donahue are opening up the old French claim by a tunnel, having partly been worked through a deep shaft.

Siskiyou.

RIVER CLAIMS.—*Yreka Journal*, Oct. 30: Messrs. Rabbit and Doherty, the former an expert in the employ of Senator Jones of Nevada, have bonded the Swiss Bar mine at Klamath river, with the intention of working it in a different manner from the way river mines are worked here. They will sink a shaft to bedrock during this fall and winter to prospect for the pay channel, and next spring put in wing dams, with apparatus to be worked by steam engine in place of requiring so many current-wheels. All the river claims at the Klamath are still being worked with excellent success, and considerable gold will yet be taken out before the winter storms commence. A rich strike of quartz has been made by a man named Bulick; the ledge being about three feet wide, and located in the gulch west of the old trail leading from Yreka to Humbug creek. The quartz prospects from \$10 to \$16 a ton in the croppings, and may pay better when further developed. The miners in the dry diggings are making preparations for work as soon as winter storms commence, by getting out a great quantity of pay gravel to run through the sluices. The hydraulic miners are also fixing up ditches and pipes to commence operations as soon as the ditches can obtain sufficient water.

Tuolumne.

GEM.—*Union-Democrat*, Oct. 27: The little Gem, the extension of the Dunlap mine, is now looking well, there being several meo constantly at work developing it. Otto Kanig and Frank McKenna leased the McKenna mine on the Stanislaus river to a company of Austrians. The ore chute is five feet wide and looks well—prospects throughout the entire length of lead. A new ditch 1½ miles long is now being dug. Frank McKenna has been developing the Dunlap mine in the same vicinity; it is a promising property. The Jeffersonville Back Tunnel Mining Co. near Jeffersonville is doing well. Mr. A. M. Stetson, the superintendent, informs us that the work of sinking the shaft 115 feet was accomplished without machinery, but that last week a fine 15-horse power engine was placed on the property. He informs us that by about the middle of December the work will be down 450 feet, at which point the channel is expected to be reached. The present grade of the tunnel, or rather shaft, is about 34 to the 100 feet. The claim immediately adjoining the Jeffersonville claim on the south is the Humbug Tunnel. This mine in former times yielded as near as can be estimated about \$5,000,000, and the Jeffersonville Co. has good reasons for believing that its property is equally as valuable. The east or back channel which they seek is the old blue channel which has been fabulously rich all along the range of Table mountain, wherein it has been reached. The company is brim full of enterprise and means to work on a large scale.

NEVADA.

Washoe District.

SEG. BELCHER.—*Virginia Enterprise*, Oct. 26: The west drift from the top of the upraise is passing into vein porphyry showing feeders of quartz.

ANDES.—Are still doing some repair work.

OVERMAN.—Explorations below the tunnel level are continued.

BULLION.—The usual work is in progress on the 500 and 600 levels.

LADY WASHINGTON.—Work in the raise above the 725 level is being pushed ahead as usual.

SIERRA NEVADA.—The main south drift on the 520 level continues in low-grade vein material.

OPHIR.—The south drift on the 1465 level is still in vein porphyry. It is out a distance of 121 feet.

UNION CON. AND MEXICAN.—The joint Union drift on the 1465 level is in Mexican ground 102 feet.

YELLOW JACKET.—The mine will resume operations in excellent shape, both on the surface and under ground.

CONFIDENCE.—Repair work is still continued. Also some prospecting is in progress in very promising sections.

OCCIDENTAL.—Extracted 140 tons of ore; shipped to the Atlantic mill, 200 tons; average assay of wagon samples, \$29.

SCORPION.—During the past week the west crosscut on the 300 level has been advanced 21 feet, making its total length 132 feet.

CHOLLAR.—The north drift on the 450 level is out a distance of 679 feet. The face is in quartz assaying from \$5 to \$10 a ton.

UTAH.—On the 472 level east crosscut No. 2 has been extended 54 feet; total length, 186 feet. The formation is porphyry, clay and quartz.

POTOSI.—The south drift on the 650 level is out 521 feet. The face is in quartz and porphyry. East

crosscut No. 2, 250 feet south of the oorth line on the 650 level, is in 421 feet. The whole face is in quartz giving low assays.

CROWN POINT.—Connection was made with the Suto tunnel last Wednesday morning at two o'clock. The drift is up through the old Belcher air shaft.

BEST AND BELCHER.—In west crosscut No. 1, at a distance of 120 feet from the main northeast drift, the work of cutting out a winze station is still progressing.

KEYSTONE.—The shaft is down to the 300 level and a southwest drift is being run toward the vein. The ground that is being passed through presents a promising appearance.

BALTIMORE.—Prospecting operations are still vigorously prosecuted on the 338 level in ground of a very promising character. A considerable amount of ore is being accumulated.

BELCHER.—On the 200 level the north drift is out 84 feet. On the 160 level the drift from the Crown Point is out 173 feet. Work on the chutes and other repairs are about completed.

JUSTICE.—Good head way is being made with the new mill. It will start up with an accumulation of over 2000 tons of ore on the dump, and a vast deal opened up in the mine ready for extraction.

ALPHA AND EXCHEQUER.—The north lateral drift on the 500 level of Alpha is in from the shaft a distance of 114 feet. The face is wholly in quartz giving low assays. The south lateral drift on the same level is in a distance of 37 feet. The face is in quartz.

ALTA.—Are running the mill on ore that is being extracted from the stopes between the 725 and 825 levels. The concentrating apparatus connected with the mill is doing good work. The west drift on the 925 level will reach the vein in a few days. On the 725 level the work of reopening the oorth drift to the Benton line will be completed in four or five days.

HALE & NORCROSS.—From the 600 level the upraise 40 feet south of joint east crosscut of the 500 level development mentioned in the last weekly letter, have started a prospecting drift 30 feet below this level and have encountered the downward continuation of the same ore. On the 800 level the west drift was advanced 10 feet and the south drift the same distance.

SAVAGE.—On the 500 level, west crosscut No. 1 has been advanced 15 feet and temporarily discontinued. The joint east crosscut on the south boundary of the mine is out 62 feet. The last 17 feet of this drift is in good ore. The car samples average \$50 a ton. On the 950 level, No. 1 east crosscut has been extended 18 feet. From the several levels are extracting about 50 tons of ore a day, which is being shipped to the Rock Point mill.

CON. CAL. & VIRGINIA.—The 1400 level stopes are looking well and are yielding the usual quantity of good ore. The same may be said of the stopes on the 1435 level. On the 1500 level are stoping ore from the parallel north drift, 60 feet north from the upraise above that drift. Continue to stop on the southeast drift run from that upraise 58 feet above the track floor of this level. The stopes on the 1600 level continue to look well. On and above the 1650 level much good ore is in sight. The quantity of ore shipped to the mills will be about the same as usual, notwithstanding the accident to the hoisting engine at the C. and C. shaft. The average of the pulp assays will be about as high as last week.

Cottonwood District.

NICKEL AND COBALT.—*Silver State*, Oct. 26: G. F. Turrittin, who visited the Cottonwood mines in Churchill county last week, says the Bothwell Bros., who are working the nickel and cobalt mines at that place, are taking out fine ore. They have good hoisting works on the mine and several men at work. These are the only nickel and cobalt mines worked in the United States with the exception of one of limited production in Pennsylvania.

Hawthorne District.

SMELTER.—*Esmeralda News*, Oct. 20: The arrangements for the erection in this county of the much-talked-of smelter appear to be coming to a head. A. E. Dick, one of the principals of the enterprise, was in town this week, and from him it is learned that a meeting of the stockholders and others interested will be held at Carson City for the purpose of settling definitely the location of the works, and that it was probable that Hawthorne would be selected as the site. It is also understood that the machinery has already been ordered, and as soon as the location is decided upon, will be shipped. Ore carrying ten per cent or more copper will be purchased by the company, and for the ten per cent class, which is very low grade, 88 per ton will be paid. There are numerous base metal mines in Moss and Santa Fe districts which are now lying idle, some of which already have as much as 300 tons of copper and lead ore on the dump ready to be delivered to a reduction works of that kind. Should the furnace be erected, the owners of those mines would then be assured that their ore could be worked near home at small cost. This point is certainly the most desirable and best for its location, for the reason that wood, coal and coke can be laid down here at less cost than further south, while a better bullion rate for transportation can also be obtained.

Jackrabbit District.

ONONDAGA MINE.—The proprietors of the Onondaga mine have decided to place a steam hoisting plant on the property. Better hoisting facilities than those now used are needed, and the appearance of the property justifies the expense. A hoisting engine has been purchased from the P. C. Mfg. Co. here, and the work of removing and placing it will begin at once. This property has been one of the standbys of that district for some time and may yet develop into a bonanza.

Jefferson District.

RICH ORE.—*Belmont Courier*, Oct. 20: The Harrison brothers are taking out rich ore from their mine. Charles Kanroth will soon start up his mill at Jefferson; the ore extracted from his mine is of a good grade.

Mount Rose District.

LOTTIE AND LIBBIE MINES.—*Silver State*, Oct. 27: The Lottie and Libbie mines, eight or nine miles from Paradise, are being worked by W. T. O'Hara. At a depth of 30 feet the ledge is about 30 inches wide, and the ore averages \$40 per ton in sil-

ver. Mr. O'Hara is a practical assayer, and the average given is below the actual results of 300 assays. The mines adjoin and are owned by W. T. O'Hara and W. C. Green, who are pretty confident that they have a valuable property.

Morey District.

LOOKING WELL.—Belmont *Courier*, Oct. 20: John A. Moore, one of the lessees of the Morey mines, informs us that the mines in that district are looking first-class, and that the lessees are extracting rich ore.

Spanish Belt District.

GOON ORE.—Belmont *Courier*, Oct. 20: The Barcelona mine continues to look well and is producing good ore. Work on the new mill at Spanish belt is being pushed rapidly.

Tuscarora District.

BELLE ISLE.—*Times-Review*, Oct. 26: The crosscut from the north drift, 250-foot level, extended 10 feet; total length, 204 feet.

GRAND PRIZE.—Water has been lowered to within 21 feet of the 400-foot level station during the past week.

DEL MONTE AND NORTH COMMONWEALTH.—The combination shaft has been sunk and timbered 8 feet. The rock continues hard, with a slight increase in the flow of water.

FOUND TREASURE.—Some ore has been taken out and shipped to reduction works. The North Commonwealth people are surveying workings, and but little work is being done on this account.

NAVAJO.—The stopes are looking well and have yielded their usual quantity of high-grade ore.

NORTH BELLE ISLE.—During the week 30 feet of the first stope on the 400-foot level, near the Queen line, have been stilled.

NEVADA QUEEN.—The stopes above the 250-foot level have yielded the usual amount of ore. Battery pulp assayed \$172.23 per ton. Average assay from 490 carloads concentrating ore \$22.65 per ton. Shipped 10 bars bullion, assay value \$20,883.19.

COMMONWEALTH.—150-foot level: No. 3 north drift from No. 1 east crosscut has been advanced 19 feet. No. 2 winze from east lateral drift has been sunk 7 feet with but little change. Joint crosscut has been advanced 12 feet; will reach the east lateral in about four days. 225-foot level: South drift has been advanced 22 feet through the same formation as found above on the 150-foot level.

Tybo District.

PAYING ROCK.—Belmont *Courier*, Oct. 20: W. D. Dimmick has discovered a good body of ore in his mine from which he will extract large quantities of paying rock.

ARIZONA.

RICH STRIKE.—Tombstone *Epitaph*, Oct. 25: Supt. Coffman of the Waterville Mining Co. reports the striking of a big body of ore in the new double-compartment shaft in the Bunker Hill mine. The body was encountered two days ago at a point 402 feet from the surface and 42 feet below the fourth level. Assays from the croppings showed 58 ounces in silver and 57 1/2 per cent lead. The whole shaft is now in ore which improves in richness as depth is attained. Four tons of ore have already been taken from the shaft.

VARIOUS CAMPS.—*Journal-Miner*, Oct. 24: The Wonder mill in Turkey creek district will be started up soon again if there is a sufficient water supply. Robert Cartmel was in town to-day trying to engage freighters to haul ore from his Big Bug mine. He has several tons out ready for shipment. Jules Baumann is in from his Lawrence mine, Agua Fria district. He has nearly a carload of high-grade ore out ready for shipment. Ore receipts at the sampling works of the Arizona Ore Co. yesterday were 32,812 pounds. During the week from Monday morning up until Friday evening, five days, the following lots of ore were received: From Kuehne & Co., Belle mine, 42,600 pounds; John S. Jones, Groom creek, 2000 pounds; Riggs & Lawler, Hillside mine, 9300 pounds; F. M. Murphy, superintendent of the Congress mine at Martinez, 35,900; Jules Baumann, Lawrence mine, Agua Fria district, 6,000 pounds. This makes a total for the five days of 96,200 pounds, or a little over 48 tons, the value of which was \$5100, an average of a little over \$106 per ton. Since the first day of May, 1888, the Ore Co. has paid out for ore to miners, \$115,000.

SILVER KING.—Mohave *Miner*, Oct. 27: N. C. Amer brought in this week from the Silver King mine at Stockton Hill, ten tons of silver ore which worked 274 ounces per ton. Mr. Amer has recently made a good strike and the vein is steadily improving as work advances. John Popham was in from Mineral Park this week with a shipment of ore from the Lone Star which worked upward of 350 ounces per ton. Messrs. Thomson, Davis & Popham are working the Lone Star on a lease, and while this shipment does not come up to their expectations, they are satisfied with the result.

NOTES.—Prescott *Courier*, Oct. 26: P. A. Craigue came in yesterday from his Dosoris mine and said that lessees of the mine are doing well. J. W. McGowan is pushing matters at the Senator. He has a large force of men employed. Expects to have his mill running in a short time. F. M. Murphy of the Congress keeps right along shipping rich sulphurets. John Lawler has just returned from the Hillside mine, which is getting bigger and bigger. Heavy roads retard the shipping of ore. Mr. Long, superintendent of the Oro Bella, and N. C. Sheekles, superintendent of the Crowned King and other mines in Bradshaw Basin, are going ahead with the work of mining and erecting mills. J. B. Kerr, in Weaver district, has his stamp-mill completed. Mr. Layton of Hassayampa district reports unusual activity in the mines of that district. Mr. Williams, superintendent, and Mr. Prout, foreman, of Copper Basin mines, act as if they would soon start the furnaces. Small lots of gold keep coming into the Bank of Arizona.

SILVER ORE.—*Silver Belt*, Oct. 27: Simon Billing has received returns from a shipment of 120 pounds of silver ore from the Woodville mine, which was sold to the Tucson sampling works. The ore assayed 6600 ounces to the ton, and the value of the shipment was \$331.45. The Woodville has produced considerable rich ore, and largely of ore going 40 to 50 ounces, which at present cannot be utilized, owing to the expensive methods of reduction

in vogue here. The Woodville is owned by James Pascoe, Simon Billing, Hyman Sullivan and Wm. Hender, and is situated 6 miles north of Globe and 1 1/2 miles from the old Emeline.

COLORADO.

PAYING MINES.—Idaho Springs *Gazette*, Oct. 24: The steady output from all of the large mines in our immediate neighborhood and the demand for their stock at advancing prices as an investment, speaks well for the mining district around Idaho Springs. The Silver Age Co.'s stock keeps advancing. The Plutus continues to produce largely. The Freeland is again coming to the front as the heaviest producer in the county. The Little Mattie is a steady shipper of very high-grade ore. The Kohinor & Donaldson Co., with their fine mill and good mines, having started up again under new management, must soon take a front rank with the other large producers. The Oneida is placing itself alongside of our best producers and bids fair to outstrip them unless the others increase their working force, which the Freeland, Plutus, Little Mattie, Champion-Donaldson and others can do, whenever they wish to enrich their stockholders with extra dividends. The Foxhall properties, at present worked by lessees, help to swell the monthly output, and a large number of smaller mines make up the large ore shipments from this comparatively new mining district.

DAKOTA.

GALENA SMELTER.—Deadwood *Pioneer*, Oct. 23: It appears probable that the Galena smelter will be blown in for its initial run, to-morrow or next day. Delay to date has been caused solely by non-arrival of coke, which left Chicago on the 11th and should have reached here long since. This not having been received, however, the management cast about them and finally succeeded in securing one carload of fuel from Rapid City. This was delivered at the plant yesterday, and before it is exhausted that due from Chicago will have been received. The bins are full of ore, and the Queen mine is daily outputting some six or seven tons. The mine can keep this up indefinitely. The Silver Bullion, Cora Bullion, Ontario and other mines in the district will contribute a measure, and the prospects are that when once started fires will not again be allowed to die out, and that the plant will be kept constantly running.

UNCLE SAM.—Deadwood *Pioneer*, Oct. 26: Two small pumps are now at work draining the Uncle Sam mine so that the Cornish pump lately received can be placed in position under the ground. Mining will begin as soon as the water is under control. The mill is in perfect repair, or will be before it is started up, and once in operation will be kept constantly pounding away. The Uncle Sam mine will be added to the list of bullion-producers before three months pass by.

MONARCH.—Developments are being vigorously prosecuted at the Monarch. Night and day shifts are employed and the pump and hoisting works kept in constant operation. The mine is looking favorable, a good quality of ore having but recently been encountered.

FLOAT.—The Galena smelter will probably be blown in to-day for a long continued run. Local engineers are more than usually busy at present making surveys of mining claims in Bald mountain, Ruby basin, Carbonate and Galena. A number of applications for patent will probably be filed next month.

IDAHO.

YREKA DISTRICT.—Wardner *News*, Oct. 27: Considering the amount of work done on the Elk creek gold mines and the recent date of their first development, the property of the Alma Con. G. M. & M. Co. may fairly claim the honor of beating the record in the list of gold-producers. The cleanup of last week astonished not only its owners but every mining man in the country. On leaving for Spokane on Monday, Mr. Wardner took with him five bars of gold weighing 966 ounces with a cash value of \$16,607. This was the result of a run of 11 days of a 20-stamp mill and is a grand showing indicating the future possibilities of the mines. Elk creek will soon be known throughout the world as one of the richest gold-mining districts yet discovered. There is now no doubt that the mines referred to will warrant the erection, at an early day, of a 100-stamp mill, and the owners of the property are the very men that will not be slow in its erection.

BEAVER DISTRICT.—Pony gulch is the scene of several busy operations; among the most prominent being the continued development of the Fay Templeton mine and the erection of the Huntington mill on that ground. The machinery of the new plant is all in place and will be running by the first day of November. The mine is opened by three tunnels, in all of which there is a splendid showing of good ore. No. 1 is in 160 feet with a crosscut of 40 feet, which will be driven to a distance of 200 feet to connect with the main tunnel which is known as No. 3. This last named working is in 200 feet, with a crosscut running toward tunnel No. 1. No. 2 has been driven 100 feet and work on its extension is rapidly progressing. Twenty-six men are at present on the pay-roll, and, under the foremanship of Jack Keeley, the work of development is most satisfactory. At least 2000 tons of ore are on the dump and the force of miners will be largely increased when the mill commences running. This being the first introduction of the Huntington mill in Cœur d'Alene, its operation is looked forward to with much interest. Its success in California is established, and those interested in its use here are confident of obtaining equally satisfactory results.

ORO FINO.—Owyhee *Avantache*, Oct. 23: About a month ago we stated that we might be premature in stating that a rich body of ore had been struck in the Oro Fino, but from appearances at that time we believed that such a body had been found. We are pleased to say that our predictions have been fully verified, and there is now in the face of the third level running south from the shaft and 600 feet therefrom, a lode fully four feet wide that will mill \$100 per ton. We are informed that for 300 feet above where this ore was found the lode has never been stoped, but is virgin ground.

ILLINOIS CENTRAL.—Rich ore is now being extracted from this lode, a large pile of which is on the

dump. We understand that the lode is of good size, the ore easily extracted and carries a large percentage of gold.

POORMAN.—The company owning this property is now cleaning out the old Belle Peck tunnel, with the view of extending it in a southerly direction to cut the Poorman lode at a depth of about 500 feet.

PHILLIPS & SULLIVAN.—This lode is showing very rich ore, but as drifts have not yet been run to any great distance on the lode, the full extent of the ore body is now unknown. The ore being extracted is rich.

SEVENTY-NINE.—This lode, owned by W. B. Knott, is showing a large ledge of good milling ore which is being bailed to the mill for reduction as it is extracted.

EMPIRE STATE.—This mine is being worked with a force of about 20 men and is looking well. The lode is large and the ore easily extracted.

OWYHEE.—This old mine is showing splendidly. The shaft and drifts are now in good ore. The mine will be developed as rapidly as possible and before a great while will be extracting large quantities for the mill.

MONTANA.

MINING NEAR BASIN.—*Inter-Mountain*, Oct. 20: It is well known that since the Anaconda Co. abandoned the Ruby they placed the same force of miners to work on some recently acquired properties near Basin. These are the Josephine, Kilrain, Last Chance and Carrie mines. The latter lodes are within half a mile of Basin, and a two-compartment shaft has been put down on the joining line of the two properties with the purpose of developing both of them from the same point. A double-compartment shaft is also being put down on a joining point of the Josephine and Kilrain lodes and has reached a depth of 70 feet, at which point crosscuts and drifts are being opened. A fine hoisting engine and boiler have been placed on these latter properties. There is considerable agitation in the district concerning a recent strike made in the Saturday Night claim, which was located this summer. The outcroppings at the surface, it is said, run from \$200 to \$300 per ton in gold and 50 per cent silver-lead. The property is owned and being operated by the three Wall brothers of Boulder and Messrs. Gibbons & Fisher. The place has been tramped over by prospectors for years, a trail being on it to the Mantle mine. The Mantle mine, a short distance from the Saturday Night, and which is said to be an extension of the rich discovery, is being actively developed and reported to be looking well. Mining in all parts of the Cataract district is said to be unusually active.

ELKHORN.—Boulder *Age*, Oct. 27: A bar of silver bullion, from the C. & D. mine, Elkhorn, was lost on the way down the other day, but was found by some honest person whose name was not ascertained, brought to Boulder and left with W. B. Gaffney, subject to the order of the owners. A stable, blacksmith shop and other structures have been erected or added to at the St. Paul mine, and the work of deepening the shaft is progressing satisfactorily. The formation in the shaft has changed, and would indicate the nearness of water. Should this come in in greater quantities than can be handled by the whim, the work of sinking will be suspended and crosscutting for the ledge begun.

GREAT FALLS SMELTER.—*Inter-Mountain*, Oct. 27: Messrs. Whitmore & Hathaway arrived in this city on Saturday with 14 tons of ore from the High Ridge mine, located about 8 miles from Twin Bridges, in the Tidal Wave mining district. They shipped their ore via the Montana Central to Great Falls. The inducements offered by the railroad and Falls smelter were greater than the sampling works here would give, and in consequence they shipped it. Ten dollars freight and treatment is pretty low, and if returns are perfectly satisfactory, more ore will be sent to the Falls smelter. Assays of their ore run from 1 to 1 1/2 ounces gold, 20 to 25 ounces silver, and from 50 to 60 per cent lead. This will run the aggregate from \$75 to \$90 per ton, and will net a handsome profit above expenses. They say they have a ledge 7 feet in width, with from 1 to 4 feet pay ore, and in places it comes in huge boulders and as much as 10 tons of ore has been taken out of one of these.

OREGON.

THE TOM PAYNE MINE.—Bedrock *Democrat*, Oct. 22: The Tom Payne mine is about nine miles northwest of Baker City and within one mile of the now famous Nelson mine. It lies in the same mineral belt and to the north of the Cracker creek mines. Mr. Geo. L. Hayes has for eight years been working this property in a primitive manner. A month ago Messrs. Young & Harris secured a contract on the property and since that time have had a set of men working under the supervision of Thomas Bentley. The developments have been of such a nature that the gentlemen have now decided to accept the property. A 10-stamp mill, to run by both steam and water power, has been secured by the present owners, and will be in running order on the mine within 20 days. A boarding-house is also in course of construction. There will be on the payroll of this company over 20 men next week.

THE SPARTA MINES.—Bedrock *Democrat*, Oct. 27: Almost within the confines of the town of Sparta is located the Oro Dell, a mine that gives great promise as a bullion-producer, as it is soon to pass into the hands of a wealthy Kansas syndicate, and before snow flies stamps will be dropping on Oro Dell ore. The mill will be ten stamps with sufficient power to double the capacity, run a saw and the necessary machinery for a first-class plant. One great advantage to the camp will be the custom department and sampling works, and all ore assaying over \$4 in free gold and \$6 in sulphurets will be bought by the Oro Dell company, as the company will put in four Free vanners for concentrating. We learn that the company negotiating for the Mary Ainsworth group of mines, 2 1/2 miles north of Sparta, will arrive from the East in a few days and work of a substantial character will commence at once.

WHITNEY.—Capt. Tom O. Whitney of Marietta, Ohio, owner of the celebrated Whitney group of mines, south of Sparta, leaves for the East to-day to complete arrangements for the permanent development of his property and the construction of the

necessary machinery to successfully treat the ore. Capt. Whitney has spent four months in examining the mines of Baker and Union counties, and is so well pleased with the general outlook that he has made several purchases.

THE NEHALEM COAL DISTRICT.—*Oregonian*, Oct. 26: It is hardly a year since the first entry of land was made in the Nehalem coal district and during that time samples have been brought here and tested with satisfactory results. Extensive developments have lately been made, and from specimens placed on exhibition at the fair it would seem as if the coal was of a higher grade than former samples would lead one to expect. Mr. S. J. Rafferty of Hillsboro, in the past two weeks has drilled into his claim about 20 feet, and he states that at the opening the coal vein showed a thickness of but two feet and that the vein pitched downward and inward at an angle of 35 degrees, and at a depth of 20 feet the vein had developed to a thickness of 5 feet. There is hardly any doubt but what there are thousands upon thousands of tons of coal in that region. Mr. Walker has also drilled into a surface vein 10 feet in thickness. There are other surface veins of from 4 to 12 feet in thickness. The following analysis of this coal was made some time since: Fixed carbon, 44.49 per cent; volatile combustible gases, 43.34; water, 7.81; ash, 4.36; total, 100. Total amount of combustible matter, 87.83 per cent. There is no doubt whatever as to the quantity, as there are from 40 to 50 claims aggregating between 6000 and 7000 acres of coal lands, which will readily give one an idea of the immense quantities of coal that can be mined and placed on the market when a four-foot vein is worked at a good profit. The mountains in which this coal is found have an immense growth of fine timber on them, which can also be placed on the market at a small cost when once means of transportation or outlet is made. A great many labor under the impression that these coal lands are located in Washington county, while with but one or two exceptions, the whole tract lies in township 4 north, range 4 west, in Columbia county, Oregon, about 25 miles from this city. There is no reason why Portland should not derive a great benefit from these mines when opened up, and be able to export coal as well as Tacoma and Seattle.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, Oct. 27: The Deep Down mill last week crushed eight tons of ore for the Mountain King. The returns were entirely satisfactory. Geo. H. Uter has purchased one-half interest in the Grand Tower group of mines at Gold Hill, from J. P. Cottrell. The Grand Tower is considered one of the best prospects in the camp. The heavy rain of last and the present week has materially livened up mining affairs at Pinos Altos. The Key, the Bell & Stephens and the Smith mills are running on full time. The Wagner mill is also running. Dr. H. H. Baker and Mr. McCreary of Kansas City have bought the Casson and Fraction mines of W. R. Corbett, who had them under bond. The mines are located at Pinos Altos. Captain Webb is now in charge of the work on the Thunderbolt at Pinos Altos, and is running two shifts of miners. Average assays taken from the vein recently show that the ore is above the average in value for the camp. The shaft will be sunk to a depth of 100 feet, after which drifting will be commenced. The *Enterprise* is under obligations to Julius Wagner, Wells, Fargo & Co.'s agent, for the amount of bullion shipped from Silver City since January 1st, to the first of the present week, which is as follows: Silver bullion from Silver City, \$71,876.57; silver bullion from Georgetown, \$104,837.39; gold bullion from Pinos Altos, \$146,243.17; a total of \$322,957.14. This bullion is generally billed at from three-quarters to one-half its real value, consequently the real value of the bullion shipped is in the neighborhood of \$500,000. The shipment of ore and concentrates has been much larger this year than ever before. The output of Grant county this year will equal that of last year.

UTAH.

BEAVER COUNTY.—Cor. Salt Lake *Tribune*, Oct. 28: The drop in lead has caused a depression here. The French Copper Co. means business, but no boom; they will try and see if low-grade copper ores can be worked at a profit in this part of Utah. No change in the Horn Silver yet. The Roe Bros. of Bristol have just made a heavy shipment of copper bullion, 95 fine, to T. R. Jones & Co. of Salt Lake.

LEAD.—Salt Lake *Tribune*, Oct. 28: Local mining interests are learning with dismay of the threatened free importation of ores from newly-developed properties in British Columbia. The Bingham miners are in low spirits over the drop in lead, due largely, if not entirely, to the free importation of Mexican lead ores. Col. Kaighn has learned that the monthly importations free of duty, via Laredo, amount to 8000 tons; and via El Paso, 7000 tons; there being no duty levied where the silver in the ore is worth more than the lead. And the outlook is more gloomy because of the Treasury ruling, that even if this be wrong, yet, as certain business interests have been built up on such a construction of the law, the ruling cannot be changed.

RUSSELL PROCESS.—Park *Record*, Oct. 27: Owing to the non-arrival of seasoned Oregon lumber and iron-piping, the Russell process at the Marsac mill will be delayed in starting up for several weeks yet. The Ontario 3-mile drain tunnel is in about 150 feet. The boilers and compressor are in place, but there is a delay in starting up the machinery on account of the failure of the necessary iron pipes to arrive. Dividend No. 149 on Ontario stock, aggregating \$75,000, or 50 cents a share, will be payable on the 31st inst. This makes the total of Ontario dividends to date, \$9,575,000.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 137,975 pounds of first-class ore and 193,000 pounds of concentrates. For the week just ended the Mackintosh sampler received 113,410 pounds of Ontario ore, 190,570 of Daly, and the Woodside leasers are completing a shipment of 212,000 pounds. The Ontario shipped during the week 41 bars of bullion, containing 21,609.95 fine ounces of silver. This morning 10 bars of Daly bullion, 10,124 fine ounces of silver, were shipped from the Marsac mill.

SCIENTIFIC PROGRESS.

Some Things That Science is Sure Of

The basis of modern science is observation and experiment, supplemented by verification as often as needed. In regard to the germ theory of certain diseases, among which typhoid fever stands prominent, there are no longer two opinions among scientific men. The exhaustive experiments of Tyndall, Pasteur, and others, have placed the truth beyond the possibility of doubt. They have sown the germs, fed, nourished, propagated, and transplanted them, and then starved, killed and extirpated them in so many different ways and under such varied conditions that they now know as much about them as the ordinary man knows about his barnyard fowls or his dogs and cats.

When Dr. Draper made the statement a while ago in the investigation of the steamer Prussian's fever cases, that there could be no case of typhoid fever without a previous case to supply the germs, he uttered no more than the legitimate dictum of science would warrant. In regard to Judge Pitman's sarcastic inquiry as to where the first germs came from, though the question is a natural and an interesting one, yet it is entirely outside the realms of legitimate scientific investigation, inasmuch as we can neither observe nor experiment upon the first germ.

Dr. Draper simply asserted the fact, which is indisputable, that in all human experience, so far as we know, the germ, or something corresponding to it, precedes all organic life. There is no well-founded evidence to the contrary. When the biologist and the physiologist talk about the germs of smallpox, and typhoid, and cholera, and the conditions under which they will live and flourish or decay and die, they claim no more than the farmer claims for having a knowledge of the conditions under which his corn or wheat or potatoes will grow or die. And if the doctors tell you that a typhoid germ will never produce smallpox, or a cholera germ diphtheria, they assert no more than the farmer when he says that a grain of wheat never results in producing a potato or a cabbage.

If the foregoing statements be true, it will appear that none of these germ diseases arise in consequence of an accumulation of filth and dirt, nor can we escape them solely by cleanliness and hygienic conditions. The mosquito, the leech, and the swamp fever prefer, if anything, the healthy to the unhealthy, and typhoid, and cholera, and smallpox have shown no dread of cleanliness and no special preference for filth and dirt. The precautions in regard to emigration suggested by our present scientific knowledge are to prevent any one who has recently suffered or been in contact with these diseases from being allowed a passage, and if any outbreak should take place on board, to have a hospital-room where the patients can be secluded and kept from contact with others.—*Ex.*

Heat Generation by Mechanical Means.

We have been asked by a correspondent to state if the heat generated by mechanical methods cannot be usefully applied and with economy. We answer—No. The reason for this reply we will endeavor to set forth in what follows: Whenever motion is arrested, whether by friction, compression, or percussion, or other mechanical means, heat is generated, the quantity of heat produced being exactly the equivalent of the mechanical energy that has been consumed—or more plainly, of the motion that has disappeared. This phenomenon is one of the most obvious and convincing illustrations of that great discovery of the present century—the correlation and conservation of the physical forces. It is simply the conversion of one form of motion—mass motion—into another form—molecular motion.

The notion, however, of employing mechanical means for the generation of heat for useful application, is handicapped at the outset by considerations of economy, which are all-important in looking at the subject from the practical side. With this element in the problem, the notion must be set down as impracticable (save in some exceptional cases), by reason, partly, of the difficulty that will be encountered in gathering up the heat and applying it without loss; but chiefly, because the generation of heat by chemical action (combustion) offers in almost every case a vastly more serviceable method of obtaining heat for domestic and industrial uses.

There are many curious and unexpected ways in which the generation of heat by mechanical means may be illustrated. We may recall the famous experiment of Count Rumford, of causing water to boil by the friction of a solid plunger fitting closely into an iron cylinder surrounded with water. The power of a windmill or water-fall can readily be made to generate heat enough to cause water to be turned into steam, by the interposition of suitable frictional surfaces exposed as to convey the heat as fast as it is generated, by the arrest of motion, into a body of water, etc. But, save in rare instances, and these to only a very limited degree and indirectly (as when the heat generated by the sudden compression of air is utilized to cause the ignition of explosive compounds), the idea of utilizing these methods is scarcely worthy of serious consideration in view of the measureless floods of heat that we are able to summon to do our bidding by using the simple act of combustion.—*Iron.*

ANCIENT MICROSCOPES.—In a recent lecture on "Ancient Microscopes" before the British Royal Microscopical Society, Mr. Frank Criepp exhibited a hundred or two collected from all parts of the world. He said that they served to illustrate the ignorance and incompetence of the ancients, which was no more than might have been expected, considering the dark ages in which our forefathers lived. They made their microscopes of paper, parchment, ivory, tortoise-shell and other such materials. One of the microscopes before them once belonged to Cardinal Lambertini, afterward Pope, who lived in the fourteenth century; he also exhibited another microscope made for one of the Popes by an Englishman; it was decorated, he remarked, with barbaric splendor. He likewise exhibited two which had been the property of George III. He exhibited ancient European microscopes, also some of Chinese and Japanese make; one of the latter had no lenses nor any place left for lenses. With most of the ancient instruments, he said, no work had been done of sufficient value to come down to the present time; indeed, with some of them no work could be done. One more recent microscope exhibited by him resembled a bent poker in shape. It was constructed to go down a patient's throat, and then, by means of a little glow lamp at the end, to light up portions of the interior of the human body, so that they could be seen by the aid of the system of lenses in the instrument.

ICE ON MARS.—At a recent meeting of the Academy of Sciences, Paris, M. Janssen, president, in the chair, observations were made on the canals of the planet Mars by M. Fizeau. The various circumstances connected with these appearances, as lately described by M. Perrotin and Schiaparelli, suggest a strong analogy with certain phenomena of glaciation—parallel ridges, crevasses, rectilinear fissures, often of great length and at various angles—observed in the regions of large glaciers in Switzerland, and especially in Greenland. This leads to the hypothesis of a vast development of glaciation on the surface of Mars, where, the seasons being relatively longer and the temperature much lower, the conditions must also be more favorable than on the earth for these manifestations. The reading of the paper was followed by some remarks by M. J. Janssen, who gave a guarded assent to M. Fizeau's "very ingenious and very beautiful" theory.

FORCE OF SEA WAVES.—Some idea of the tremendous force possessed or exerted by sea-waves may be formed by the fact that an iron column, 23 feet long and weighing some 6000 pounds—part of a new lighthouse being built—was, in the course of operations, landed at Bishop Rock, England, and, a storm coming up, was left lashed by a half-inch chain at each end to strong eyebolts. Three days afterward it was found, on examination, that the great column had been tossed up by the waves a distance of some 20 feet to the top of the rock, where it was yawing about like a piece of timber. Two days afterward, when the workmen were able to land, it was found that a blacksmith's anvil weighing 150 pounds, which had been left in a hole 3½ feet deep and 2½ feet in diameter, had also been washed by the waves completely out of the hole.

AN ALLOY FOR COLD SOLDERING.—*La Metallurgie* describes a new alloy which is useful when metals are required to be soldered together at a low temperature. Finely divided copper is obtained by adding zinc to a solution of sulphate of copper. From 20 to 30 parts of this copper, according to the hardness required, are mixed in a cast iron or porcelain mortar with concentrated sulphuric acid, to which is added 70 parts of mercury. The amalgam thus formed is thoroughly washed with water, in order to remove the sulphuric acid, and after being left untouched for some time it becomes sufficiently hard to scratch lead. In using the alloy for soldering, it is warmed until it assumes the consistency of wax, in which state it can be applied to the joint.

CARBON DYNAMITE.—One of the latest additions to the list of high explosives is called carbon-dynamite. It is composed of 90 parts of nitro-glycerine absorbed by ten parts of a variety of carbon. London *Iron* gives an account of some experiments with it, which seem to show that it possesses several important advantages over ordinary dynamite, among others considerably greater power, and the generation of much less noxious vapor when exploded in confined places. It is claimed also to be entirely unaffected by water.

LUMINOUS BACTERIA.—Prof. Pfleger and Dr. Tilanue have succeeded in cultivating, by Dr. Koch's method, the bacteria which produce the luminosity of sea fish. They have also been able to place them on a glass slide, which, in the dark, appeared thickly strewn with luminous points. Prof. Van Haren Noman has succeeded in photographing them.

MANGANESE STEEL, notwithstanding its high proportion of metallic iron—the most magnetic metal known—possesses the peculiar property of being almost entirely non-magnetic.

ELECTRICAL WONDERS are always on the increase, and every wide-awake man wants to keep pace with the progress of their development.

MECHANICAL PROGRESS.

A NEW BELTING LEATHER.—The Helvetia Leather Company, an incorporation recently organized by several prominent business men at Lancaster, Pa., manufacture from animal skins a sort of leather, exclusively for machinery purposes, by a special process. As is well known, in the ordinary process of tanning with bark, the tannin of the bark combines with the fiber of the skin, the result being a hardening or stiffening of the latter, which makes it especially adapted to resist abrasion or wear, as, for example, the leather used for shoe soles, or the same leather softened by oils used for the uppers of shoes. The Helvetia process is more a curing than a tanning operation. In it but 60 to 72 hours are required for the heaviest hides, instead of the six months of the bark process; and a cured hide of about one-third its original weight and four-fifths its original size, but in which every fiber of the hide has been perfectly cured and softened, is produced. Its tensile strength is claimed to be about four times that of the best oak-tanned leather, and when torn it shows a fiber very similar to that of a hemp or flax string. It is not adapted for belts when they are run under water, or are splashed with water, as with constant wetting the leather stretches rapidly, but always remaining soft, and being light and strong, pliable and firm, this leather is perhaps unequalled for belting, lacing combining apron straps, and the like.

PRESERVATION OF RAILWAY IRON FROM RUST. M. W. Spring of the Belgian Academy of Science and of the Paris Chemical Society, is of opinion that this phenomenon is solely due to a chemical cause, namely, the formation of a black oxide resulting from the combination of the yellow oxide with the metallic iron under the pressure of passing trains. He has demonstrated in his laboratory that on pressing into metallic iron slightly moistened ferric oxide an adhering coating of a black magnetic oxide is obtained. The pressure applied, 1000 to 1200 atmospheres, scarcely exceeds that brought to bear by each 50-ton locomotive wheel. And finally, on scraping off with a brass wire brush the black scales formed on the rails where the wheels bear, they proved to consist of magnetic oxide, with a very small proportion of metallic iron. Hence it will be understood why unused rails are covered with rust while an occasional train is sufficient to keep them clean and bright, magnetic oxide being one of the best protecting agents for iron surfaces. Mr. Spring's explanation appears very reasonable, so far as it goes, but it does not exclude the other causes mentioned, especially the influence of oil and grease permeating all railway machinery.—*Chicago Jour. of Com.*

ONE OF THE ORIGINAL LOCOMOTIVES.—The late A. L. Holley once made an after-dinner speech in relation to his early experience with Corliss' original locomotive. He reviewed his experience substantially as follows: The idea began to obtain hold that science should be pursued not in books, but in things; and I commenced the pursuit of science in and on and under one of the awfullest things this world ever saw. It was Corliss' original locomotive, euphemistically called "the Old Jigger." This locomotive was possessed of a certain inborn coarseness, which could hardly be the attribute of a mere machine—her spiritual nature was a sort of Mephistophelian ooze with a Colorado mule, and as to her physical constitution and membership, a cotton-factory "mule" was simple in comparison. The Old Jigger had an innumerable number of valves; and as a valve motion, well, nobody ever counted the number of pieces. They were as the sands of the seashore. Most of them used to jir off the first few trips of the week, after which all the men in the shop could comparatively keep track of the rest of them.

ECONOMY OF THE IMPROVED SIEMENS FURNACES.—Mr. Frederick Siemens, writing to the editor of London *Iron*, states that in the new Siemens furnaces, introduced since 1853, which are heated by radiation, the consumption of fuel is found to be reduced to less than eight cwt. of small coal to the ton of steel ingots produced. This saving in fuel is combined with the further advantage that the steel made is much more free from blow-holes than that made in furnaces heated by contact of flame, the finished metal being therefore stronger. In the older form of open-hearth furnaces, 150 charges were regularly made without a stoppage, and in the furnaces heated by radiation a much greater number of charges are made. At several works over 300 charges have been made without repairs; at one works 440 charges were made, and at another works a furnace had worked for 12 months, making two charges per 24 hours, without stoppage for repairs.

ECONOMY OF DEEP VS SHALLOW FURNACES.—A contemporary in a recent issue discusses the question of whether a deep or shallow furnace gives the better result economically. This is an important question, says the *Locomotive*, and one which has given rise to much discussion, and the distances fixed upon by different engineers show a great discrepancy, varying all the way from 15 to 36 inches for the height between grate and crown sheet. A difference of height with different kinds of fuel is undoubtedly necessary to obtain the best results, but the

best height will be found between the above extremes. An eminently safe rule to follow in all cases is: *Burn your fuel as close to the heating surface as you conveniently can.*

RIVETING STOVEPIPE.—A recent invention is a machine for riveting stovepipe. In this old way each of the six or nine rivets in a piece of pipe was drawn and driven separately. By the use of this riveting machine all the rivets are drawn by one drop of the hammer, and all of them are set by one drop of the hammer. One man with this machine can turn out from 600 to 1000 joints of pipe per day. The pipe is formed on a cylinder connected with the riveting machine, and this makes it uniform in size and leaves the lap smooth and free from buckles. There is, we believe, no machine of this description in the market, and it is said the invention will mark a new era in the manufacture of stovepipe. It is easily operated, there is no complicated machinery about it, and it does the work perfectly.—*Chicago Jour. of Com.*

IRON PLATES VS STEEL PLATES.—"During the last few weeks," says an English exchange, "a strong feeling has set in among shipbuilders in favor of iron plates in preference to steel for shipbuilding purposes, and makers of iron plates—particularly in the North—are reported to be very busy. Indeed, we heard of a firm having a very large order to place this week, who had to apply to most of the makers in the North before they could place the order, and then only for very long delivery. In fact, the makers are so busy that it is difficult to arrange for earlier delivery than from four to six months. We understand that the tendency in favor of iron plates is owing to the excessive rust now said to accumulate on both sides of the steel plates. We have no doubt that steel-plate makers will speedily devise means to obviate the defect."

LOCOMOTIVE BUILDING IN THE SOUTH.—The *Manufacturers' Record* calls attention to the fact that although there are upward of 38,000 miles of railway in the South, or nearly one-fourth of the entire mileage of the country, there is not as yet a single plant in the whole section from Maryland to Texas devoted exclusively to locomotive building, with the single exception of a small establishment in Maryland, where narrow-gauge locomotives are built. Our neighbor calls attention to this fact as affording a splendid field for enterprise. At the rate at which the industries in the South are being developed, it will not be long before this want is met. The South during the past few years has set the rest of the country an example of enterprise and push that has deserved, and has evoked, unstinted admiration.

STEEL PLATES AS CHEAP AS IRON ONES.—The firm of Carnegie, Phillips & Co. has sent out a circular to the trade stating that the firm will make the same prices for soft steel plates as are now quoted for iron plates for bridges, ship, tank and structural work generally. The fact that steel can be sold as cheaply as iron is occasioning surprise. A member of the firm said recently: "The steel is 15 to 30 per cent stronger than iron, and the result is that it has superseded iron; until now all important structures are built of steel. While steel for such purposes is being sold about as low as iron, prices have stiffened a little recently. It can scarcely be called an advance, but a hardening up of the market, as the demand is now good."

AGE OF LOCOMOTIVES IN GERMANY.—Herr Leonhardt, a German engineer who has been investigating the subject, says that the number of locomotives in use on German railroads at the end of the railroad year 1885-6 was 12,450. The average age of the locomotives in use during the year of service 1884-5, was 12.60 years; and in 1885-6, 12.49 years. This is deduced from a table of the number of engines added and in active use for each year, from 1845 to 1885. From this table it appears that 59 engines built prior to the year 1850 were running during the year 1885-6, and that the distinction of being the oldest running engine in Germany falls to one on the Holsleinische Marschbahn, which dates back to 1845.

OLD RAILS AND NEW.—A ton of old iron rails and \$4 will buy a ton of new steel rails. This is inducing the railroad companies to take up their old iron tracks and replace them with steel. For this reason old iron rails are becoming more plentiful in the market than they were a few weeks ago, when they were scarce. The new iron rail does not cut much of a figure any more, but the old iron rail is a very important factor in iron-making, and after it has become extinct, as in the course of a comparatively brief period it will, it will be easily missed, unless something as good or better should in the meantime take its place.

AN ELECTRIC DRILL weighing 100 pounds, and that makes a hole three feet deep in hard anthracite in 30 seconds, and one 6 feet deep in 1½ minutes, is the latest thing in electric drilling machines. It is designed by W. M. Schaeffer of Philadelphia.

A CENTER CYCLE.—An English invention is the "center cycle," having four wheels a foot in diameter, and a large wheel in the center. With it the rider is enabled to go up-hill as easily as to go forward on level ground.

GOOD HEALTH.

Is Malaria a Delusion?

Edwin Walters writes to the *St. Louis Republic* as follows: Malaria, so called, is a delusion. The word malaria means bad air. The disease that are attributed to this cause are frequently common in districts where there is no stagnant water or anything else to taint the atmosphere. It will be remembered that during the autumn of 1881 there was an unusual number of people who were attacked by these diseases in Southwestern and West-central Missouri and also Eastern Kansas, when there had been no rains of any consequence for months, and that, too, in districts far removed from decomposing water or any other substance. The cause or causes of these diseases were surely not in the air, consequently should not be attributed to malaria. It is more probable that during the dry, hot weather of summer the heat that is radiated and the electricity that is generated by the sun have an enervating influence on the system—that from the nerve centers this influence reaches the muscular system, principally through the pneumogastric nerve, and the stomach being the most delicate and intricate of almost any of the involuntary muscles, is the principal sufferer from such enervating influence. Indigestion follows as a symptom, and an increase of bile brings what is called biliousness and malaria.

I hope my medical friends, and I claim many as such, will pardon the presumption on my part of the discussion of a subject that comes more within their province than that of mine. But this conclusion has been forced from observations that reach over a period of many years as a surveyor in the West. I have observed that there were more cases of sickness of this kind during, or immediately after, the season in which there were the greatest number of electric showers or electric disturbances as shown by the surveyor's instruments. I conclude, then, that heat and electricity are the prime causes of "malaria," and that they weaken the stomach, and, in a large majority of cases, produce the disease usually attributed to this cause.

I give the thought to the profession with the hope that it will offend none.

Brief Chapter on Relishes.

The relishes are of two classes. First, those which depend mainly on one or more piquant substances, such as pepper, mustard, ginger, horseradish, vinegar, cinnamon and the various spices. These are combined with some one or more—generally with several—of the following vegetables as a base: tomatoes, usually green; onions, cabbage, cucumbers, pears, peaches, currants, berries, grapes.

Secondly, those which depend mainly on sugar, combined with the juices of various fruits, or with the pulp, as in the case of marmalade.

Now the question arises, are these and similar relishes conducive to health?

A normal, vigorous appetite needs no such aid. It is sufficient of itself. The lower animals need nothing of the kind. The cow's green grass, the horse's dry hay, and the dog's bone with a little meat on it, are doubtless eaten with a relish that our pampered stomachs know little of.

Unfortunately, all people have not high health. Some are in a feeble condition, with little or no appetite, and yet their recovery depends mainly on the food they take. In such cases some simple relish is not merely greatly desirable, it is necessary.

Many persons, in this driving age, come to their meals with little appetite. A sensible appetite quickens and increases the gastric secretions. In such cases, therefore, some piquant relish is really helpful. Probably even the strongest is not injurious, if need with moderation; but relishes are greatly pernicious if used to encourage overeating or to cause one to eat when the stomach is already exhausted from previous repletion.—*Youth's Companion*.

A BOY WITH TWO HEARTS.—The patient was again anesthetized. An incision was made in the neck over the tumor. The cartilaginous cyst was corrugated slightly and resisted the knife strongly. The surgeon had to proceed with the greatest caution and he on the lookout for the slightest puncture of the artery. An opening was finally made through the cartilage, and it was extended for about three inches. The hemorrhage was only ordinary. Within this hard sac there was a small body covered with a membrane. Dr. Wyeth had never seen anything like it before. To facilitate further cutting, as well as to find out what the body was, a strong light was reflected into the cavity. The surgeon glanced within and turned away in dismay. And well he might, for there in full view was a miniature heart beating with great energy. The venous and arterial systems were perfectly developed, though on a small scale, and, as far as could be judged, extended through the entire body, independent entirely of the heart in the chest. Dr. Wyeth did not cut any further, though he would certainly have liked to see what effect the removal of the auxiliary heart would have had on the patient. A photograph was taken of the heart with a detective camera before closing the wound. In examining the cartilage it was discovered that the irregular formation of its surface was due to the existence of small ribs, which nature had thrown

around the heart for protection. The wound was sewed with silk, and beyond a slight inflammation has not given any trouble. The swelling in the neck, of course, can never be reduced, but there is nothing to indicate that it will ever prove detrimental to the boy's health.—*N. Y. Cor. Globe-Democrat*.

DON'T DISGUISE THE TASTE OF MEDICINE.—Disguising the taste of medicine in taking it detracts from its value. If you wish to get the best results from a medicine, do not rob it of its taste. The first effect of any medicine administered through swallowing is of a magnetic or dynamic character. This is occasioned by the influence the medicine exerts upon the network of sensitive nerves that lines the throat and back part of the tongue. These delicate nerves stand as sentinels or outposts to warn the various nerve centers throughout the body of the presence in the palate of any foreign substance. Instantly certain nerve centers become agitated, and that portion of the system under their immediate control feels the effect of the medicine before it reaches the stomach. Especially is this the case with bitter medicines. But when we disguise the taste with sugar or other palatable ingredients we deceive the nerves and the medicine passes the throat without imparting a dynamic effect. As proof of the correctness of this theory, it can be shown that certain cathartics will move the bowels by simply placing them on the tongue for a moment and then spitting them out.

LOBSTER IS DANGEROUS OUT OF SEASON.—An experienced fisherman at the seaside told an Albany gentleman not long since that he did not believe a lobster was fit eating for any one in summer. He said the only time to eat lobster was in fall and winter, and that he had known many instances where persons had been made sick by eating lobster in summer. The statement recalls the fact that was brought to the attention of another Albany gentleman, that Colonel Perkins, the famous Norwich, Conn., centurion, who died recently at a hotel near New London, was a victim of lobster. The Albanian was a guest at the same hotel. The centurion on his arrival at the hotel ate a very hearty supper in the evening and partook freely of meats and vegetables, and also ate a quantity of lobster. Within a short time he was taken sick with what appeared to be cholera morbus and never rallied.—*Albany Journal*.

USEFUL INFORMATION.

The Metal in Solomon's Temple.

That there was more metal in the Temple of Solomon than was ever collected in any other building, we take to be an historical postulate. But it still remains to be asked: How was so much metal cast? With what molds did the Hebrews manage to do it? Where did they perform their operations? As to molds, it seems evident from the Scripture accounts that clay mixed with sand was the molding material. In our own time this is esteemed the safest mold. But what a vast series of furnaces must have been required for such operations, and how harmonious must have been the action, the outpouring from the molds, to produce the giant unity of design! Was there a national foundry on the plains of Jordan before the Jews were carried captive to Babylon, and did Jeremiah allude to it as having been "repaired" at the time of the restoration of the temple? Possibly this may have been so. But we must remember that the Phoenicians were the main founders and workers for the mighty King Solomon, who remunerated them; that as the tabernacle owed much to Egyptian arts, so the temple owed much to Phœnician merchandises. It may be doubted whether the bronze wonders of the temple were not a good deal more foreign than home-made. Jerusalem became the focus of the world's industries, because its king was the master of the world's intellect. "But Solomon built him an house" is only a graphic way of saying that he used his intellect and his influence for the combining in one storehouse all the glories of his profoundly artistic age. *Ad majorem dei gloriam* was the motive of the assemblage, but art and commerce brought the "sinews," if not the homage.—*Ironmonger, London*.

THE RAILWAY AND TELEGRAPH IN JAPAN.—The Japanese have railways connecting Yokohama with Tokio, and another from Kobe to Osaka and Kioto, both routes of the first importance to travelers; and these lines will be extended to all parts of the country, but the work of construction is not pushed with vigor. In telegraphs, too, Japan is making good progress. She has two lines connecting with Europe, one passing by Hong Kong and India, the other by China and Siberia. There is now a question of establishing another line, passing by the Hawaiian Islands and America.

SHODDY IN GERMANY.—Germans are said to take the lead in working up old woollen rags. When properly prepared for re-spinning, this material has been christened "artificial wool" instead of "shoddy." A very large business has recently grown up in that country with this material, which is manufactured from old hosiery, flannel, woollen goods, tailor's mungo, old clothes and rags. From reports published it appears that Germany has for the past eight

or nine years annually imported on an average about 7000 tons of this commodity, and has for some years annually exported nearly 140,000 tons a year. The import duties levied on the importation of chevots into Germany eight years ago have largely stopped the trade between Great Britain and Germany in this shoddy, which was formerly used for making waterproof garments, etc.—*Draper's Record*.

MENDING OLD WINDOWS.—One of the worst jobs the "all-around" repair hand has to contend with is the mending old windows. Putty comes off hard sometimes, and often the sash will be split and badly damaged in the attempt to chisel off the old putty. Once in awhile very old sashes are found the putty on which has a large proportion of white lead mixed with the whiting. Such putty can hardly be removed with a chisel without taking wood with it from the sash. When time can be taken—say over night—it will help to cover the sash thickly with a paste made from three parts of lime, one part of potash, and a sufficient quantity of water. If this is done, and the sash laid one side for 10 or 12 hours, the putty can be removed without breaking the glass—a job not easily done by any other means. A slush of this same mixture can be plastered on some of the grease-drowned jobs which every repair-man must tackle. A liberal coating left on over night and an application of water from a hose under 60 pounds pressure will have a most magical effect.

TO IMITATE OLD BRONZE.—The repeated applications to copper or brass of alternate washes of dilute acetic acid and exposure to the fumes of ammonia will give a very antique-looking green-bronze; but a quick mode of producing a similar appearance is often desirable. To this end the articles may be immersed in a solution of one part perchloride of iron in two parts of water. The tone assumes darkness with length of immersion. Or the articles may be hoiled in a strong solution of nitrate of copper. Or, lastly, they may be immersed in a solution of two ounces nitrate of iron and two ounces hyposulphite of soda in half a pint of water. Washing, drying and burnishing complete the process.

PROCESS FOR PRODUCING SURFACE DISCOLORATIONS.—A German company has patented a process for producing surface colorations upon articles made of copper, zinc or brass. Upon the first-named metal it is possible to develop all the color of the rainbow, and upon zinc the coating is formed of such thickness as to permit of chasing the surface. The most important application of this invention seems to be in the imitation of antique bronze, the results in this direction being very satisfactory, both in the matter of durability and resemblance.

UNDERGROUND TELEGRAPH WIRES.—In London not one of the 1700 lines of wire entering the Central Telegraph Station is above ground. In New York the wires will soon be all sunk. The fire department has contracted for cables for the underground service; the Brush Electric Light Company are drawing their first cables into the Broadway conduits, and the East River Electric Light Company now use an underground cable.

TO MAKE A GOLD SOLDER. the following proportions for 100 parts are recommended by an exchange: Silver, 54.74; gold, 11.94; copper, 28.17; zinc, 5.81. Melt the first three metals together in a covered crucible; when the cover is slightly cooled, add the zinc a little in excess of the proportion given, and stir up the alloy continually. This solder runs very easily, and is much esteemed by manufacturers.

STRENGTH OF CAMEL-HAIR BELTING.—According to experiments recently made at the Royal Polytechnic School at Munich, the strength of camel hair belting reaches 6315 pounds per square inch, while that of ordinary belting ranges between 2230 pounds and 5260 pounds per square inch. The camel-hair belt is said to work smoothly and well, and it is unaffected by acids.

THE MOUSE PEST IN AUSTRALIA is much worse than the rabbit pest. The climate is so soft that they have thriven enormously, and there is said to be "hardly a residence or store that is not pestered by the plague, while from every side come tales of crops devoured so rapidly that many fields have had to be abandoned, what was left not being worth reaping."

THE ENGLISH SPARROW AT HOME.—The English farmers have turned against the sparrow as a pest to agriculture, and are offering rewards for their destruction. It is asserted that these vicious birds cause a loss to agricultural England of \$40,000,000 to \$50,000,000 per year.

EXTENSIVE SALT DEPOSIT.—It is said that enough salt underlies the vicinity of Ithaca, N. Y., to supply the world for a century, and that a syndicate has been formed to build there the largest salt works in the State of New York.

WOMAN IN SIAM.—Of the 15 students sent by the Government of Siam to receive professional training in England, four are young women.

AN AMERICAN COMPANY has leased Aboukir bay from the Egyptian Government to grow oysters.

The Walker-Carter Process.

In a letter to the *Bozeman (M. T.) Courier* a correspondent thus refers to the Walker-Carter process which is being worked in the Red Bluff District:

These facts point out the great want for some cheap or economical system to extract at a profit the values contained in these large bodies of ore. The first sure step in the right direction, as illustrated by the Booz and Appalachian ores, is oxidation—some cheap way of changing these sulphides to oxides. While great results will flow from perfect oxidation, still much loss is experienced as shown by mill and arastra tailings—the saving "hardly ever" giving over 60 per cent of the assay value and generally about ten per cent below that figure. This loss is occasioned by the fine gold floating off and generally known as "flour" or "float" gold and by gold that is "coated," so that it will not amalgamate when brought in direct contact with mercury. This loss and its cause is generally pretty well known among millmen, and many plans have been devised to save these values, but so far without any appreciable success if I except the Walker-Carter dry or vapor amalgamator in operation at this point. I have before me the most positive proof that this machine will save the gold in the class of ores mentioned. I will state a case in point here: During the month of August the Walker-Carter mill at this place, among other dump ores, treated 24 tons of ore from the Red Bluff mine, which assayed \$4.80 gold per ton, making a total value of \$115.20 in the 24 tons, six tons from the dump of the Idaho which assayed \$11 gold per ton, making \$66, and three tons from the Emperor dump assaying \$10 gold per ton, making \$30. The total value of the three lots of dump ore from the three mines mentioned is \$211.20; the cleanup produced a bar of bullion worth \$180, or over 85 per cent of the assay value. It is safe to state that neither the stamp-mill nor arastra could have extracted anything near this percentage, hence it is plain that this amalgamator saves values lost by the old system, both on oxidized surface ores and ores oxidized artificially. Ores treated by this Walker-Carter process in Idaho and the results obtained prove the amalgamator will recover a very high percentage of the gold, no matter how fine it may be or how coated. I have already referred to its successful treatment of Golconda ore, obtaining very satisfactory results without the same being roasted. This mill is in daily operation and any one can make all the investigation desired, and I am satisfied all facilities will be afforded to make the same as searching and conclusive as possible. The main point is that this process is making money from a class of ore thrown away as worthless. It is daily demonstrating that an ore in this section carrying \$10 gold per ton, will pay whether they have to be roasted or not; of course the profit will be greater if roasting can be avoided. The expense of operating the Walker-Carter mill for 24 hours at this point, as near as I can figure, is \$75. This includes oils, lights, loss of mercury and handling. Treating 20 tons of \$10 gold ore and recovering 50 per cent would give a daily net profit of \$85, or in round numbers \$2500 per month. By roasting I believe over 90 per cent can be maintained, but on this class of ore the net income would not be increased, as the cost of roasting would be equal to the extra percentage saved. I figure, of course, on the minimum basis of value in the ores treated. As most of the mines in this section will produce a much higher grade ore, the monthly net output from a 20-ton Walker-Carter mill will be nearer \$5000 than \$2500. When you consider that there are at least 20 gold claims in this district that can in all probability now produce on an average five tons of ore per day each, that will sample and assay \$20 gold per ton, making a gross daily output of \$2000, and that \$1800 of this value can be saved at an actual cost of \$375, not including mining, it means the inauguration of a new era in mining and milling substantial and lasting in its characteristics and beneficent in its results to the whole community—making property, now apparently worthless, valuable and giving an impetus and push to all branches of industry.

STRUCK BY LIGHTNING.—Nature makes use of some rather unique methods in revealing to man the hidden wealth that lies concealed in the bosom of Mother Earth. West Salem, in the Unknown district, has for some time been known to be rich in gold-quartz veins. A stock company has been organized and a 150-foot tunnel run in. About three months ago L. R. Bacon, superintendent of the works, was visiting a neighboring mining camp. On returning home in the evening, he was overtaken by a thunder-storm, and the electric fluid struck the rocks near where he stood, scattering fragments all around him. Next morning he went out and examined the rock and found it gold-bearing quartz. He pulverized and panned a piece of the rock and it proved to be rich in the shining metal. A tunnel has been run 35 feet, and the lode appropriately named the "Thunderbolt." W. T. Coad and J. U. Gridley were appointed a committee to examine the work on the above-named lode and report to the company. Yesterday they returned, and report the rock in the Thunderbolt to be the richest yet discovered in that locality.—*Republican*.

The Trinity-river dam and tunnel have been completed.



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TABLE OF CONTENTS.

EDITORIALS.—Sulphuric Acid Manufacture, 289. Passing Events; Steamer Losses on the Atlantic; Mining Stock Reforms; A Pacific Coast Relief Chart; The Russell Process; Twin Screw Steamers, 296. Refining Sugar by Electricity; Directing of Sawdust—A Growing Industry, 297. Recording Earthquakes, 298.

ILLUSTRATIONS.—Cast Iron Cylinder, 1870; Apparatus Employing Iron Pots in Sulphuric Acid Manufacture, 289. Improved Iron Still Used in Sulphuric Acid Manufacture, 297. Plummets for Recording Earthquakes, 298.

CORRESPONDENCE.—Kern County Mines; Mining Law Suggestions, 290.

MISCELLANEOUS.—A Bedrock Flume; An Asbestos Bonanza; Seven Devils, 290. The Russell Process; A Good Cement, 291. The Walker-Carter Process, 295.

SCIENTIFIC PROGRESS.—Some Things that Science is Sure Of; Heat Generation by Mechanical Means; Ancient Microscopes; Ice on Mars; Force of Sea Waves; An Alloy for Gold Soldering; Carbo Dynamite; Luminous Bacteria, 294.

MECHANICAL PROGRESS.—A New Belting Leather; Preservation of Railway Iron from Rust; One of the Original Locomotives; Economy of the Improved Siemens Furnaces; Economy of Deep vs. Shallow Furnaces; Riveting Stovepipe; Iron Plates vs. Steel Plates; Locomotive Building in the South; Steel Plates as Cheap as Iron Ones; Age of Locomotives in Germany; Old Rails and New, 294.

GOOD HEALTH.—Is Malaria a Delusion; Brief Chapter on Relishes; A Boy with Two Hearts; Don't Disguise the Taste of Medicine; Lobster is Dangerous Out of Season, 295.

USEFUL INFORMATION.—The Metal in Solomon's Temple; The Railway and Telegraph in Japan; Shoddy in Germany; Mending Old Windows; To Imitate Old Bonzer Process for Producing Surface Discolorations; Underground Telegraph Wires, 295.

COTTON AND WOOL.—Decreased Imports of Cotton Goods; Lubricants for Wool; The American Wool Industry; Our Export of Cotton Goods; Oiling South, 298.

SHOP NOTES.—Count the Cost; Shop Note; Shop Mounting for Blue Prints; Graphite as a Lubricant, 298.

STEAM BOILER NOTES.—Portable Engines; High Speed Engines, 298.

OUR LUMBER INTERESTS.—Hunters in Maine Lumber Camps; A Big Lumber Scheme in Oregon; The Great Leary Lumber Rife, 299.

SAW MILL NOTES.—Sawmill Refuse; Band Saw for Lumber; Evolution of the Saw, 299.

FLOUR MILL NOTES.—Corn and Wheat; Wheat Growing in India, 300.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 292-93.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 304.

Business Announcements.

[NEW THIS ISSUE.]

Stamp Mills—Tatum & Bowen.
Split Pulleys—John Simonds.
Copying Apparatus—F. F. Daus & Co., N. Y.
Frue Concentrators—Ward & Co.
See Advertising Columns.

Passing Events.

It appears that the Great Falls smelter people are taking Butte ore away from even the Butte smelters. If the Butte sampling men do not bid higher for ore, the Great Falls people will get more of it in future. Ten per cent on the assay value or 10 to 20 per cent for unit value on lead ores is quite an object to the miner who takes out and ships a quantity of ore, and one he is sure not to overlook. The competition will be good for Montana miners.

Just now so much attention is being paid to politics that current mining news is rather scarce. Business generally is dull and is not expected to improve until the excitement of the Presidential election is over.

The long-hoped-for water is expected into Tuscarora district next Monday, when the Navajo

mill will start up. North Belle Isle, Nevada Queen and Commonwealth are now building jointly a fine new mill to cost about \$160,000. A 40-ton furnace is also being built. The new \$40,000 concentrating works will treat 100 tons a day. The new water works cost \$130,000. The mines of this district are now attracting more attention than any other in Nevada, except those of the Comstock.

Lead miners complain greatly of the Treasury ruling under which so much lead ore is coming in from Mexico as silver ore without duty.

The engineers' commission on debris matter has not yet commenced work but will shortly do so.

Mining-Stock Reforms.

An item in one of the daily papers is to the effect that the Stock-List Committee of the San Francisco Board is investigating the claims of the West Chollar Mining Co. before allowing it to be placed on the list.

There is no doubt at all if closer investigation had been uniformly made before listing mines on the stock board the mining-stock business would never have reached the depressed condition which has existed for the past few years. It seems to have been more of a question of paying a specific fee for the privilege than anything else. As a result, "wild-cat stocks" without number have been brought before the public. There have been hundreds of mines that never paid a cent and were never expected to.

The result has been that people lost confidence in the stocks and the boards. The fact that the name of the mine was regularly called, and the stock quoted in the board, was no guarantee whatever that the mining operation was a bona-fide one. It might well have been, however, had the board exercised more discrimination with its list. The board could well have afforded to have at least some sort of examination made of the property.

Another matter, too, should have received attention. That is, the personnel of the officers and managers. There are many promoters who are well known to have played all sorts of dishonest tricks with mining companies. They have purposely mismanaged them; turned most of the money into their own pockets and swindled the stockholders outrageously. The fact that any one of these men had anything to do with a company should justify the board in refusing to list it, or in removing it from the list. Such men are generally well known to the brokers, and their practices understood. The public could have been protected by the board better than they could protect themselves.

But the board fell into an easy-going sort of way and paid little attention to these matters. No thoroughly active steps were taken to reform the business, and the result has been the stock market has fallen in favor and the prices of seats on the board greatly reduced. The fault lies with the board itself. Had they utterly refused to have anything to do with wild-cat stocks and dishonest manipulations, the public would have more confidence and do more business. As it is, the good mines have to suffer for the bad.

A Pacific Coast Relief Chart.

A photoplate of a relief map of all that region embraced between the southern boundary of California, northern boundary of Washington and eastern boundary of Utah has just been issued by the publishers of this paper. It was made from a relief model in plaster, which illustrates the mountains, valleys, lakes, rivers, etc. The original model was made by Isaac Winston and Prof. George Davidson of the U. S. Coast and Geodetic Survey. The model itself is five feet three inches by five feet six inches in size. An orographic model of this kind has never before been made of the Pacific Coast, and the chart shows a facsimile of it. It gives a much better idea of the topography and orography of the region than can be gained by Mercator's projection maps. The idea of a bird's-eye view is conveyed, while at the same time the correct proportions are preserved. The continuous chains and isolated ranges of mountains are shown with the adjoining valleys and water-courses.

Even a slight study of this chart brings out many interesting features which an ordinary map could not show. Take the great interior

basin of California, for instance, one of the largest valleys of the world. It shows here like an enormous elongated bowl, the sides formed of mountain ranges. Coursing through the center of this valley are the Sacramento and San Joaquin rivers, which receive a large part of the drainage system of the State. Their windings may be traced from the source to the sea.

The great backbone of the coast, the mighty Sierra, stands prominently in view, dividing the coast region from that of the great interior.

The configuration of the ranges and mountains can be traced in such a manner that the routes of the principal railroads can be seen as they take advantage of the natural passes.

The coast line is an interesting study in itself. A portion of the ocean-bed is shown, so that the abrupt rising of the land is plain. In places are deep submarine valleys, and again the shoaler submerged land is apparent. The bays, harbors, inlets, river-mouths and islands are also figured.

Numbers are placed on the chart, and a corresponding index gives the names of the principal mountain peaks, lakes, rivers and cities. The course of any large river may be traced winding through the mountains to the sea.

In short, this chart will give any one a very excellent idea of the surface features of California, Nevada, Oregon, Washington, and part of Montana, Idaho and Utah. Nothing of the kind has ever been published before relating to this coast. It is finely executed and printed on heavy paper, 19x24 inches in size, suitable for framing.

Steamer Losses on the Atlantic.

It is a startling fact that within the space of 47 years, commencing with the loss of the steamer President in 1841, nearly 100 fine ocean steamers have been lost in making passages across the Atlantic. Of this number, eight were never heard from after sailing; ten were run down in collisions; five were burned, and three foundered in mid ocean. About 70 have been wrecked upon the coasts of the Atlantic or British Isles. It is generally supposed that most vessels are lost by the violence of the elements in the open sea; but out of the 100 above enumerated only three or four succumbed to such a cause. A large proportion of the others were lost by casualties which it would seem could have been avoided by proper care. Dark nights, dense fogs and miscalculation of distances run seem to have been the primary cause in a large proportion of the casualties. These are conditions which a little more care or slower running might have avoided.

Most of these wrecks were attended with loss of life. In all, 5600 persons perished. With the loss of the Atlantic, in 1873, no less than 562 persons disappeared; with the City of Glasgow 480 went down. When the Austria was burned, 470 were lost. These were the most disastrous losses, although with several others from 200 to 300 and over were lost.

In 1873 no less than six large steamships were lost, wrecked, run down or disappeared. By the Atlantic and Ville du Havre alone, 788 lives were lost that year. This is a fearful record of disaster to human lives, and it does seem as though greater care and provision might be had to avoid such catastrophes. Probably it is to fast running, when danger is liable to be encountered, that the greatest loss is due. Time may be important, but safety and life are more so.

Just now there is great rivalry in speed between the different Atlantic lines. If such rivalry must be kept up, let it be known which company prefers speed to safety, and let travelers choose between the two. There is but little danger in fast steaming in clear weather and an open sea; but in foggy weather and dark nights, with the ocean covered with steamers and sailing vessels as it is now, and nearly all running in one narrow sea-path, slow speed and the most careful lookout are the great factors of safety, and should be carefully adhered to by all passenger-carrying steamers.

RACKAROCK.—From the tenth report of Her Majesty's Inspectors of Explosives (England), it appears that rackarock powder consists of chlorate of potash, with dead oils (heavy mineral oils), nitro-benzol or other liquid hydrocarbons, with or without the addition of sulphur.

Twin-Screw Steamers.

The steamer City of New York, from which so much was expected in the way of speed, has thus far proved a decided failure for swift steaming. The special interest invoked was the experiment of twin screws. Many argued that they would not show any decided advantage over the single screw. Her first trip and return showed that the vibrations caused by the working of her two powerful engines were too severe, and led at one time to the necessity of slowing down and a final stoppage of the engines, which remained at rest in the open sea for over two hours.

There is no question but that twin screws have proven a success in a certain class of steamers—merchant steamers and ordinary men-of-war. We have the record of an English paddle-wheel steamer which was recently changed into the twin-screw type, the result being to increase the carrying-power of the vessel by 190 tons, large additional cattle-carrying space being gained by utilizing the room occupied by the paddle-wheels, while the net register was decreased 247 tons. The speed was also considerably increased and the fuel consumption greatly decreased.

It is believed by many engineers of repute that eventually the twin screw and triple engine will be found as successful on fast passenger steamers as it has proven to be on slower vessels. It is seldom that any great departure from established practice meets with success at the outset.

The standard of efficiency which has been reached by side-wheel steamers and the single screw has been attained by slow and gradual growth. One improvement after another has been added, until a high degree of excellence has been attained. Very few of those who have watched the development of any new principle applied to engineering will conclude that the twin screw principle, as applied to fast steamers, has proven a failure by reason of the thus far failure of the City of New York to reach the anticipations of what was expected of her by those who are in too much of a hurry to await future developments.

The wonderful record recently made by the Etruria was not realized until she had been running several years and her machinery had been carefully worked and perfectly fitted to its parts. The machinery of the City of New York is yet in the hands of its builders, and will be for several trips to come, and it is more than probable that modifications will have to be made before final and satisfactory success has been attained.

The Russell Process.

In this number of the PRESS we conclude the article on the "Russell Process," which was commenced in this number of July 20th and has been continued from week to week. The paper forms a valuable contribution to modern metallurgical knowledge, describing as it does in detail experiments and results obtained under varying and different conditions. Many of the tables give important comparative results only arrived at by exhaustive practical experiment.

What is of great interest to miners of precious metals is the comparative statements with relation to amalgamation and lixiviation. The old lixiviation process, as conducted by Patena, Kiss, Kustel and Hoffman, had defects which made it inapplicable to certain ores. The Russell process has overcome the defects of the ordinary process, and, since its introduction at Silver Reef, Utah, in 1884, it has gradually grown in favor. As to its advantages as compared with amalgamation, these have been detailed in the PRESS. In fact, to quote Mr. C. A. Stetefeldt, who has recently published an excellent work on "Lixiviation": "The lixiviation of to-day is essentially the Russell process in one or in all its features."

We have devoted a great deal of space to this process, in order that our readers might obtain all the details. Great interest has been manifested by the mining community in leaching, and we have from time to time given more or less concerning it in the PRESS; but the opportunity has never before offered to present its features so fully.

At the meeting of the Technical Society of the Pacific Coast this week, Miraden Mansoor, engineer of the Harbor Commission, read a paper on "Swamps and Marsh Lands of California."

Refining Sugar by Electricity.

Are We to Have a Revolution in the Sugar Business?

Various hints have been thrown out during the past 10 or 15 years in regard to a new and cheap process for refining sugar by the use of electricity. Quite recently, the subject has taken on a more practical shape by some alleged experiments in Brooklyn, N. Y., where large quantities appear to have been successfully put through the process. The experiments were made at the residence of the inventor, or, rather, his representative, for the inventor himself recently died. The house, it is said, was carefully examined to see that there was no large quantity of refined sugar on the premises. Nothing was overlooked, except a large pile covered with canvas, which the searchers were assured was a portion of the machinery used in the process. Forty barrels of crude sugar were then taken into the house and put into an upper room, while it was, in the presence of witnesses, gradually emptied into a "hopper," from which it passed through an intervening room below, in which was the alleged machinery, and thence to a third room, where it came out in a condition of absolute purity in three different assorted grades or sizes of crystals. The appearance of the sugar was quite different and superior, in fact, to that which is produced in the ordinary way.

The Process a Dry, a Cheap and a Secret One.

It is claimed that the process is dry—that the sugar is not dissolved in water, as is done by all other methods, and that there is no waste in molasses or syrup; that all the saccharine matter forms into crystals of pure sugar. If this is a genuine process, it is certainly a most wonderful one, and exceedingly inexpensive. The raw, dark sugar of commerce is elevated to the top of a building, shoveled into hoppers, and, inside a half hour's time, the same sugar, in dazzling white crystals, is pouring from a spout on the lower floor in assorted sizes, absolutely pure, with a continuous stream running as long as the feeding continues. All the saccharine matter is converted into crystallized or granulated sugar without being dissolved, or the use of bone-black for purifying, as by the old process of evaporation. It is reported that this experiment was made under the eyes of experts and capitalists, who, upon the results, have resolved to put up a five-story building in Brooklyn, with machinery of a capacity to refine 4000 barrels daily. The cost of refining by this process is reduced about two-thirds—or, say, from six to two cents a pound—besides saving a large amount of sugar which is wasted or greatly reduced in value by the existing process. Indeed, it is said that a refinery, with a capacity of 1000 barrels a day, can be erected and put in working order by this process for \$100,000; while a refinery of the same capacity, to work by any of the existing processes, would cost \$1,000,000. Thus far, the process is a profound secret. It has not been patented; its details are not known, and have never been seen by those who are putting up the money for it. They know nothing but results. They do not even know but what the pile of alleged machinery, which the experts saw, was a pile of refined sugar, with which to deceive them by running it down into the room below, while its place was taken by the crude sugar from the room above.

The Reported Success Creates a Great Excitement.

Sugar merchants, brokers and refiners all over the world appear to be in a great flurry at the recent reports published in regard to this alleged discovery. If this is a genuine and practical process, as claimed, and can be worked so cheaply and as well as reported, it will create a complete revolution in the sugar business of the world and greatly reduce the price of that universal article of household consumption. It is said that the parties allied to, who are about to put up an extensive refinery in Brooklyn, consist of English and American capitalists, representing at least \$15,000,000, and that they are prepared to erect electric refineries in all the principal cities on both continents. This system it is said has been in process of development for the last 10 or 15 years, but it has so repeatedly failed in accomplishing its purpose that the faith of those who at one time believed in its ultimate success was so frequently shaken as to create a prejudice against it

and eventually secures the condemnation and amasses the incredulity of its erstwhile advocates.

Pacific Coast Refiners Incredulous.
Our San Francisco capitalists who have an immense amount of money invested in the pres-

holders. If the English investors have taken the bait prepared so alluringly they must be ready to bite at anything.

"Some time ago we received a small quantity of sugar that purported to have been refined by electricity. If it had been produced

from Havre. On that account he reported adversely. Under the circumstances we don't think there is anything in the new method."

Gus Spreckels simply expressed a lack of interest in the electric method. He had seen samples that purported to have been produced by the Brooklyn concern. They were all of merchantable sugar which would command ready sale anywhere. Mr. Spreckels said he had not been offered the right for the Pacific Coast, and was not anxious to acquire it until some more light was thrown on the subject.

Is It Another Keely Motor Affair?

The methods of the operators are about the same. Nothing of the process is shown. The whole thing certainly has a very suspicious appearance. They claim that it is a dry process. How can pure sugar be crystallized out of a dry mass of crude sugar? In the laboratory, in the factory, in nature—everywhere—all things crystallizable are crystallized out of a solution, either liquid or gaseous. Has this wonderful inventor discovered a new principle in nature? If a streak of lightning or artificial electricity in any manner produced, is passed through masses of dry or merely moist sugar, the effect is the very opposite of anything like crystallization. The sugar or other material is rendered still more amorphous and more difficult to crystallize. If we take a solution of anything crystallizable and place it in a magnetic field—that is, in a space where electricity may be carried around it by means of a coil of wire, or in a locality in close proximity to a powerful dynamo—crystallization will be rapidly set up and very large crystals, and of very perfect form, will result. Crystals may thus be very rapidly formed from a liquid solution. But if we take the same substance in a dry pulverized form, a magnetic action will be set up, and the pulverized material will be moved from its natural condition and arranged in geometrical forms, varying according to the nature of the material or force of the magnetic action set up; but nothing in the way of crystallization will take place. Sugar in solution can be refined and crystallized by electricity—by placing the solution in a magnetic field; but so far as is known not on an economically practical scale. The conversion of a mass of crude sugar into pure crystals without first putting it into solution, is too much to ask one to believe. We would sooner risk our money in the Keely Motor scheme. San Francisco sugar-refiners are wise in waiting for further developments before abandoning their present processes.

Disposing of Sawdust—A Growing Industry.

Lumbermen have always found the disposition of sawdust and waste lumber at the mill a source of great annoyance, cost and labor. Where water is plenty it has been run off down the stream; but complaints loud and imperative have come to the mills by reason of the floating sawdust nuisance polluting streams and otherwise seriously injuring riparian owners below the mills. Courts have granted injunctions, staying such a disposition of the waste products.

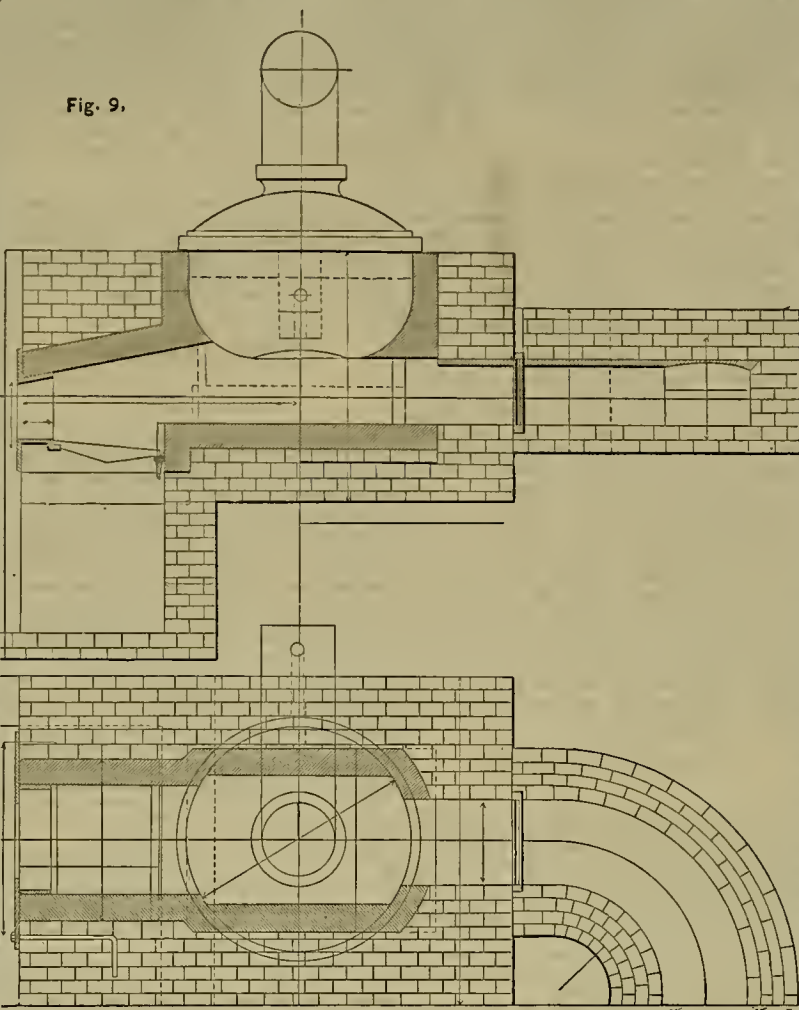
Large furnaces of open or basket ironwork have been built, into which the waste material has been dumped, and thus consumed, as it is neither safe nor practical to burn it in heaps upon the ground.

But a still better idea has recently been put in practice of saving instead of destroying such waste. A late number of the *Industrial Journal* describes this machinery and process as follows:

At the sawmill is erected a tramway, and along this runs on wheels a box-shaped receptacle or curb in which the material is pressed. The entire outfit weighs about 2½ tons, and requires a space about 20 by 30 feet. When the work of pressing begins the sawdust or other material is dropped into the receptacle, and by means of power either from a water-wheel or engine a pressure of 125 tons is secured. It is plainly evident that no covering of cloth, unless it be of metal, can withstand such pressure, and just here comes in one of the notable inventions connected with the machine.

By a peculiar arrangement, which has been patented, a metallic case is so placed inside the curb and inside the hurlap, which finally forms the covering to the bale, as to enable the removal of the matter pressed after it has been confined by wire or rope. The curb is so devised as to open at all four corners, allowing the bale to drop to the floor or ground, leaving the curious lining inside. Then by a motion of the lever the curb is closed, new binding material inserted, and the whole apparatus ready to go

Fig. 9.

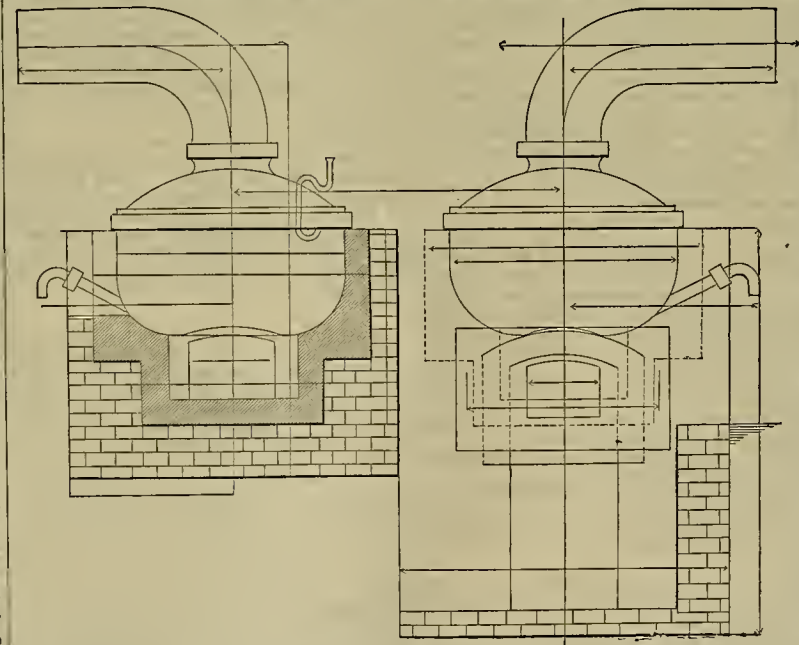


IMPROVED IRON STILL USED IN THE MANUFACTURE OF SULPHURIC ACID.

ent mode of sugar refining, do not seem to be much alarmed over the prospect. They say they expect a change when the millennium appears, but are not disposed to investigate the subject any further just now. To a reporter of

in the regular way it would have been sent back, as the samples showed what is technically known as a 'false grain,' which unfit it for consumption."

"Are you investigating the process?" asked



SECTION OF FIG. 9.

the *Examiner* of this city, Supt. Barr of the American Sugar Refinery recently said: "This alleged electrical process is several years old. Articles describing the process have appeared off and on in the *Sugar Cane*, published in England, during the past four years. The trade knows nothing of the business, as no information can be obtained. The scheme has always been regarded as a sort of Keely motor affair, owing to the great secrecy observed and the fact that information is withheld from stock-

the reporter.

"No; we are willing to abide by the report of a French expert who was sent, out from France to examine the plant at Brooklyn, N. Y. The right to manufacture sugar in France has been offered to Say's refinery for \$1,000,000. Before closing the deal, Mr. Say demanded an explanation. His expert was denied admission to the building, and when he left New York to return to Paris he knew no more about the application of electricity than when he first sailed

through the operation again. Two carns can be used advantageously to one press, and two men can operate a curb.

Sawdust when haled in this way becomes so compact as to be well-nigh impregnable, weighing 325 pounds per bale. These bales measure about 24x28x36 inches, and are readily taken by transportation companies at the lowest rate of freight. If the sawdust be moist when haled it will speedily become dry, the bale all the while remaining firm. And another peculiar feature is that the sawdust, even after being subjected to this great pressure, falls apart like meal on being opened, the particles not adhering together.

The machine is intended for the compressing of sawdust, shingle hair, refuse wood and bark, and in fact everything in the shape of waste coming from sawmills, box factories and all kinds of wood-working establishments. Hemlock bark can now be ground where peeled, pressed into bales, and thus distributed to tanneries at a large saving in the cost of transportation.

Refuse from mills, such as bark, sticks, etc., can be baled in the same manner as sawdust, and as that no covering is used, it only being necessary to put salt on the top and bottom of the bale. It is not difficult to see that the machine may have a marked effect on the kindling-wood industry. Millmen who have heretofore found the removal and destruction of such refuse attended with considerable expense can confidently expect hereafter, without any additional outlay, to get the same baled and ready for market.

COTTON AND WOOL.

Decreased Imports of Cotton Goods.

The decrease in the imports into this country of the finer classes of cotton goods illustrates the rapid improvements which this country is making in such manufactures as lawns, satens, etc. During the ten months ending April 30, 1887, nearly 3,000,000 yards of foreign uncolored cottons were imported. In previous years the total was much larger. For the ten months ending April 30, 1888, the importation amounted to only 917,000 yards. This falling off is due to constant improvements in the character and wider variety of the fabrics produced by American manufacturers. The New York *Commercial Bulletin* of a late date says that the finest foreign productions can now be duplicated on the machinery on this side of the Atlantic, and, with the aid of the duty on the European article, at a lower price than the latter can be imported. Hence, while it is the fact that the sale of "white goods" in this country this season has been of enormous volume, importers have been unable to sell more than one-third of the moderate quantity they brought over and marketed a year ago.

While different in some particulars, the data of importations of colored cottons are equally as interesting. The most striking point shown is the fact that while more satens, etc., have been not only made but marketed by American manufacturers this year than ever before, the importations of similar foreign goods have increased considerably. Thus, during the ten months ending April 30, about 24,162,000 yards of foreign colored cottons were landed on the American shores—a total that is nearly 1½ million in excess for that of last year. The domestic production discloses finer work this season than ever before, and in some instances the best goods make a novice discreditable showing in comparison with the famous Mnlhouse productions. It may be stated without hesitation that the drafts upon the foreign market have not been due to inferiority of American goods. The fact is, that the American machinery employed on that class of fabrics, although larger than ever before, has not been sufficient to turn out enough goods to meet the demand.

Lubricants for Wool.

There appears to be some differences of opinion in regard to the value of different lubricants for wool. Two of the principal essentials for a lubricant for wool are care and economy of scouring and freedom from a tendency to heat and thereby cause spontaneous combustion. A cotemporary says: The claim that lard and olive oils are superior to mineral oils is open to dispute. The higher price of the former renders the temptation to adulterate them greater, but supposing there was no difference in price, mineral oils have certain advantages over animal and vegetable oils which should not be overlooked.

First, as to body. The claim that mineral oils have no body is not valid, for the finest cylinder and valve oil, the finest machinery and spindle oils, the finest hot-neck and crank-pin greases, even the thick, heavy-bodied grease, used to daub the sides of ferry-slips, and, in short, most lubricants for machinery, heavy and light, fast-running or slow, are made from the "product of the oil wells." A mineral oil, by a simple process of reduction, as one would build down molasses candy to make it thicker, can be made of almost any thickness of body. In this respect mineral oil can be made to fully "fill the bill" as to the first two essentials. First, sufficient fluidity to secure thorough distribution; and, second, body enough to prevent running when the stock remains in bulk.

Second, as to gumminess. When any oil is distributed over the surface of the wool, it is

brought closely into contact with the oxygen of the air. All animal and vegetable oils are oxidizable by such exposure, some slowly, some more rapidly, and some so rapidly as to cause heating. In this respect lard oil is not absolutely safe, yet the danger is slight in the case of the purest and best winter-strained oil. Olive oil is demonstrably dangerous. Mineral oil is absolutely unaffected by the oxygen of the air in this way. It does not gum and does not heat; so that, in the third essential mentioned, it also "fills the bill." As to the fourth essential, which is of the least importance, and can be allowed for in process of manipulation, which has to be done where moisture is used, for that evaporates more rapidly than any oil, lard and olive oil answer the purpose so far as "staying there" is concerned; but when we reflect that the longer they are allowed to remain on the fiber, the more firmly they become attached to it and the harder it is to scour them off, while the slight evaporation from a first-class mineral oil of 400° test only makes it easier to scour out and make it a more perfect lubricant, we must conclude that the advantage still lies with mineral oil. As to scouring. All animal and vegetable oils require an excess of alkali in the scouring fluid. Without such excess they cannot be scoured at all. Alkali is injurious to the fiber. Sufficient alkali will dissolve wool fiber altogether. The less used the better. Mineral oils scour by their affinity for the grease of the soap. They scour more easily in a cold neutral soap than in a hot strong soap. Which would appear to be the best oil to use—animal, vegetable or mineral?

In conclusion, mineral oil is steadily superseding lard oil and olive oil. It would succeed more rapidly if it were not that oil dealers, who do not understand the essentials of a good wool oil, foist some light, thin-bodied oil, or mixture of nasty grease and light oil, on the inexperienced manufacturer, and so do both themselves and the manufacturer serious injury. The remedy for this danger is to go slowly, study and experiment cautiously, and having found out how to tell a good mineral oil from a bad one, or rather a proper from an improper one, buy from responsible parties only.

The American Wool Industry.

Hon. Wm. Lawrence of Ohio, one of the best authorities on the wool industry, has a paper in the *American People* to show the amount of wool annually required for consumption in the United States; that under a tariff reasonably protective, American wool growers and manufacturers can produce all the wool and woolen and worsted goods our people need; and that free wool will practically destroy the wool industry of this country and give foreigners a monopoly of wool production.

The number of wool-growers in the United States is estimated at about 700,000; fully 500,000 persons are employed by them, and hence, if to this there he added their wives, children and other dependents, at least 4,000,000 persons, or about one-fiftieth of the population of the United States, are more or less interested in the growing of wool. Besides, there is a great number of farmers—estimated at 150,000—who keep a small number of sheep, but who could not be fairly classed as growers of wool.

The number of sheep is estimated at 50,000,000, and the crop of wool at 350,000,000 pounds, worth \$77,000,000.

There are sold annually from 13,000,000 to 15,000,000 sheep for mutton, worth about \$3 per head, making the total value of wool and mutton sold each season about \$122,000,000. It is a vast industry, in which every State, and almost every county, is interested.

The rapid increase of American wool-growing and wool-manufacturing under protection is shown in the appended table:

	1870.	1880.	1870.
Wool clip, lbs.	60,000,000	162,000,000	232,000,000
Wool m. n's.	\$65,596,000	\$172,495,000	\$267,252,000

"To check the magnificent growth of this great industry," says the *American People*, "so beneficent in all its results to the entire country, would be criminal. To destroy it would be worse than treason."

France grows but 25 per cent of the wool she uses.

This country furnishes one-sixth of all the wool grown throughout the world.

The United States is the second wool-producing country in the world.

Eighty per cent of the wool used in the United States is produced here.

Wool-raising is the only great farm industry in the benefits of which every section shares.

The annual value of the wool crop is from \$75,000,000 to \$90,000,000, varying with the market value.

The United States is the only civilized country in which, in recent years, there has been a large increase in the production of wool.

The wool clip of the United States increased from 60,000,000 pounds in 1860 to more than 300,000,000 pounds in 1884.

Wool growing is the sixth in importance of the agricultural industries in the United States, and is surpassed only by corn, wheat, cotton and oats.

The consumption of wool in the United States increased from 1870 to 1880 about 70 per cent. The population increased in the same time but 30 per cent.

The average weight of a fleece of wool in this country in 1860 was less than three pounds. In 1870 it was 3½ pounds; in 1880 it was 6

pounds. In 1880, in Great Britain, it was 4 pounds.

The quantity of foreign woollens used by our people per capita decreased from \$1.35 in 1859 to 35 cents in 1879, while the consumption per capita of American woollens increased in the same time from \$2 in 1859 to \$5.34 in 1879.

OUR EXPORT OF COTTON GOODS.—The quantity of colored and uncolored cotton goods, of domestic manufacture, exported from the United States in 1887 was nearly 204,700,000 yards, over two thirds of which consisted of uncolored goods. This was the largest exportation of cotton goods for any one year ever shipped from our ports. In 1866 the exportations amounted to 3,448,000 yards, and in 1880 to 106,580,000 yards.

GOING SOUTH.—Many of New England's skillful cotton operatives seem to be taking situations in Southern cotton factories, and we occasionally receive letters from them expressive of much satisfaction with their new positions and the beauty of the country.

SHOP NOTES.

Count the Cost.

Everything, no matter how small, has some value. Everything used about any shop, mill or place of business costs something, and no matter how small it is, or how little it costs, it should in some way be accounted for. Everything purchased should be thoroughly weighed and its value noted. The price paid for a thing is not an exponent of its value. Its value consists in the return it brings. A hook, paper, machine or appliance is of no kind of value to its owner unless it gives him something in return, or renders an equivalent for time or money expended, and we should "count the cost." A thing we cannot use, and consequently is of no value to us, is dear at any price.

Before buying any machine we should see it, or its duplicate, working under all the conditions the machine is calculated to work under, and in no case buy a second-quality tool or one that will do a small amount, or an inferior quality of work. The cost should be counted, and if more is paid for it than it will return to us in work performed, it is a dear purchase.

The cost should be counted in buying belting. A poor belt is costly at any price, for it never runs well or pulls well, and costs more in time to lace and relace and patch than two or three good belts would in the end. Lacing should be carefully selected.

The first cost of anything is a small item, and not a single thing should be bought because it can be bought "for a mere song." What will it cost to use or run it, comparatively? If it is a machine, count the cost of oil, belting, time spent in repairs, and amount and quality of work done in a given time, and compare it with another machine doing the same kind of work.

In buying files there should be a close discrimination, for files are curious things to buy. There are thousands of them so poor that a junk-dealer would not run the risk of stealing them, for the cost of carrying them to his piles of old iron would be more than they were worth. The only way to get good files is to count the cost of using, and get hold of some firm who always furnish a first-class file, and stick to them. Don't ever buy, or borrow, an acid-recut file.

Count the cost in hiring labor, and be careful in selecting it. A man may be a good man for somebody, but not for you. A man to be of value in any particular business must be adapted to it and be able to do it with ease and dispatch. Simply because he is a man is no sign that he will be of value to you as an employee. Count the cost of everything in the sense of what value it will be to you in using.—*Wood Worker.*

SHOP NOTES.—A reversible pulley, either for screw-cutting or for any other purpose, must invariably have a loose pulley on either side, and the driving pulley on the shaft above must have surface as broad as all three, in order that the belt may have it full face-power. Since the introduction of absolute fixed gauges of exact sizes into the machine shops in place of the universal calipers there has been a steady improvement in the quality of work, particularly of machine tools. Accompanying this improvement there has unquestionably been another—that of the workman. Both are evidences of progress in the right direction. The use of straight edges, surface plates, solid, hardened steel gauges, rings for external and plugs for internal diameter measuring, and measure pieces and thread gauges, demand the practice of exactness on the part of the workman and tend to insure exactness in the result of his work. If a shaft is so far "out of true" that a straight line from center to center of the length falls at any point outside of the diameter, it must be taken to the forge before being trued up on the lathe.

SHOP MOUNTING FOR BLUE PRINTS.—A correspondent of the *American Machinist* suggests the following cheap plan for mounting blue prints for shop use as one which has proved satisfactory in the absence of anything more elaborate or expensive: We send either blue prints or cheap pencil drawings to the shop, the latter when we expect to

make only one piece of that kind. We take the sketch or print to the circular saw sorap-box and pick out a couple of convenient strips, say 1" to 1½" wide x 3 16" to 4" thick, and as long as the blue print, tack them together with small brads, the upper edge of the print being caught in between them; two gimlet holes and a piece of heavy twine complete the job, and we have a light, handy and inexpensive mounted drawing, 50 of which can be hung on a common hook, if so desired, and selected as wanted. We suggest the plan as a shop kink to those who may feel disposed to make use of it.

GRAPHITE AS A LUBRICANT.—The use of graphites, sometimes styled plumbago or black lead, is becoming greatly extended as a lubricant, for the lessening of friction and heating of journals. For this purpose it is growing rapidly in favor. For lubricating purposes none but the very best plumbago will answer. It must be pure and free from grit. This purity is attained, not by bolting it, but by floating the plumbago in either air or water. The water method is simplest, and during this process it is treated with a bath of dilute sulphuric acid, which takes up the particles of spar and iron, leaving the sulphates of lime, magnesia and iron easily washed out. For metal bearings the plumbago should be used with oil, but for wood bearings, after a few applications of oil and plumbago, the oil may be dispensed with and the dry powder only used. On hot axles or journals, it should be applied freely dry, then oil up as usual. Although plumbago was used for this purpose more than 200 years ago, the true method of preparing it was not known until within a few years, so that it comes before the public almost as a new material.

STEAM BOILER NOTES.

Portable Engines.

The builders of portables engines have one very serious disadvantage with which to contend, and a disadvantage which they cannot overcome. Their engines go largely into the hands of men who have had but little or no experience in running and caring for a steam engine. There is no encouragement for a builder to put a fine finish on such engines, because they would never have the "dope" wiped off them by the buyer, to say nothing about their being kept clean afterward. Neither is there any use in making a nice fit of the crank and cross-head brasses because the first Sunday job of the amateur engineer will be to key them up and spoil the fit by slackening them up before he can start Monday morning. In nine cases out of ten one-half of the trouble is caused by ignorance and the other half by the pretensions of the engineer (?) in charge. The builders realize this, and because one seeks to get around the trouble by making his engine with a large cylinder and slow piston speed, and another tries to obviate another objection by making his engine light and running it fast, they ought not to be "blowed up" for the apparent discrepancy. The discrepancies which are vastly more harmful and dangerous are the discrepancy which lie between good workmanship and the ordinary workmanship on portable engines, and the discrepancy between ordinary intelligence and common sense and the ignorance and stupidity of the average engineer.

Whether it is better for an engine to be made large and heavy and develop the requisite power at slower piston speed and moderate pressure, or whether the same power should be gained by faster speeds and higher pressures, in order that the engine may be lighter, is an open question, though one thing is certain, viz., that there are many engines running to-day at piston speeds which would have been deemed impossible a few years since. In the case of portable engines for farm purposes it may be set down as an axiom that the boiler pressure should be kept as low as possible, and this is best done by having both boiler and engine of good size. There is nothing to be gained by making a portable engine too light or too small, and there is a direct loss in economy and a material increase in the risk of operating them.—*Wood and Iron.*

HIGH SPEED ENGINES.—A cotemporary, in alluding to the very high piston speed which is occasionally employed at the present time, says: "This rate of speed has been carried about as far as the present state of mechanical perfection will allow. With a theoretically perfect machine, there is no difficulty in getting almost any piston speed desired, but in practice the bearings will heat and bedplate spring, until the theoretically-admirable machine is anything but satisfactory to its purchasers, who want a steady, reliable power from 10 to 23 hours each working day of the year. The Porter-Allen high-speed engine has been much talked about by engineers and mechanics of advanced ideas, and it is probably the best-built machine of the kind in the market, but it is by no means an assured success, for the reasons mentioned; and if our esteemed contributor osres to take a short journey, we can show him a pair of them which strikingly illustrate the difficulties in the way of getting unlimited power from a small machine by the 'doubling pressure and number of revolutions' plan."

OUR LUMBER INTERESTS.

HUNTERS IN MAINE LUMBER CAMPS.—A correspondent of an Eastern journal who is familiar with the Maine lumber camps writes as follows: "In the far-back camps, where big game is abundant, they have found one or more hunters who are barbed, with free board, for the sake of having fresh meat provided. The hunters are paid \$4 per hundred pounds for the dressed meat delivered at the several camps. The hunters set lines of traps for fur and cover a great extent of territory, reaching far beyond the operations of the lumbermen, where game, especially moose, seek uninterrupted grounds. But in most camps some of the men have rifles and on Sundays go hunting, and a great deal of game is gotten by them, but mostly deer and caribou, especially the latter. In crusting-time these men kill many moose also. I will relate some facts I learned on my last trip this summer. One hunter shot 12 moose, not to speak of deer and caribou; and another man in the same camp shot 3, and of these 15 moose the meat of only 3 was saved. Another hunter shot 8, another 7, and two others 4 each. Here are 38 moose shot by 6 men in and about the works of two operators only. Now there are a score or more of operators in the country as well stocked with big game as those mentioned. My trips every summer cover territory not visited by sportsmen, and embraces 100 miles or more of main streams and small tributaries. I visited eight camps, and at all of them were seen moose legs, heads and pieces of skins. More than this, I saw and talked with some of these very hunters and men who worked in the lumber camps. Every season till this I have seen live moose every day while in that section, some days several together; but on this last trip I saw three all told, and not one track to where I used to see dozens. This tells the whole story, and if next winter should be as favorable for crusting as the last past, the moose will receive their quietus, or nearly so. From present indications greater operations are planned than those of last season."—*Forest and Stream.*

A BIG LUMBER SCHEME IN OREGON.—A Michigan syndicate appears to be buying up a large quantity of timber land in Oregon. The *Astorian* of Oct. 5th says: Considerable activity is displayed in filing on timber land, large quantities being filed on in 160-acre tracts at \$2.50 an acre on both sides of the river. A Michigan syndicate, worth, it is said, \$12,000,000, are buying up an entire township. Township 7 north, Range 7 west, back of Knappa, getting all they can from probasere who have secured a patent from the Government timber land. Just whether they intend to build a \$150,000 sawmill, or gobble all there is in sight and hold it for the next 20 years, is not at present gettable, as a syndicate doesn't get out a brass band, nor come to a newspaper office the first thing, but the *Astorian* has it straight that a combination of Michigan capitalists, who know a good thing when they see it, are getting hold of all the timber land they can get a clear title to back of Knappa. Some of the timber land is a wonder, many 160-acre tracts having 10,000,000 feet on each of them. The syndicate is getting bonds for deeds for the space of 60 days from many of the owners of 160-acre tracts. Ten dollars an acre is reported to be the ruling price, though \$25 in some cases is said to be the asking figure. It is thought that if the Michigan men realize the necessity of immediate operations they will at once begin the building of a railroad westward from Knappa.

THE GREAT LEARY LUMBER RAFT, which went adrift off Nantucket eboals in December last, or portions thereof, are still drifting about the Atlantic to the great annoyance and danger of shipping. Some of the logs have recently been seen near the Straits of Gibraltar. The residents of the Azores and Madeira islands report their shores lined with trunks of bge trees, which are, beyond doubt, part of the Leary raft. Captain Lawrence of the bark Platena, from Huelva, Spain, reports passing on September 4th, in latitude 35°, longitude 18°, great fields of logs adrift. This is the greatest distance to eastward where they have been seen, being directly on the coast of the Madeira islands. The ravages of the teredo worm and the water-soaked condition of the logs render them of no market value. The weight of barnacles, which has been forming on them for months, has caused the monster logs to disappear partially beneath the water, and they are more of a danger than before. The extent of water covered by these logs may be gathered from the report of Captain H. H. Staudt of the German bark Bremen, who states that he was five days among the logs, many of them striking the ship, tearing the copper and damaging the rudder. Samuel Dabney, United States Consul at Fayal, Azores, reports that on June 12th a spruce log, 40 feet long, drifted ashore. It was roughly sharpened at both ends and was identified as part of the raft.

A MORTGAGE of \$1,620,000 was filed in the Inyo County Recorder's Office, last week, by the Carson & Colorado Railroad Company. The prevailing opinion is that the money will be used to extend the road to Los Angeles, and that it will be ready for travel by July 4, 1889.

The Tahoe logging-camps have closed for the season.

SAW MILL NOTES.

Sawmill Refuse.

The safe disposal of sawmill refuse is literally a burning question, and one which in many places is really a serious one and involves the expenditure of large sums of money. After the saw dust and refuse has been burned under the boilers in steam-mills, and all that can be out up into lats thus disposed of, there

plates, and lined with brick. This is about 60 feet high, and then tapers in till it is about 14 feet diameter, and thus is continued another 50 feet, and is crowned with a spark-arrester. The refuse is carried up about 50 feet, and is there discharged by a suitably-shaped mouth-piece, so as to scatter the refuse over the bottom of the burner. This burner cost several thousands of dollars, and has been in use for several years with great success. The spark-arrester frame is made of wrought-iron piping, with the ends left open, so that air circulates through it and keeps it cool. This is covered

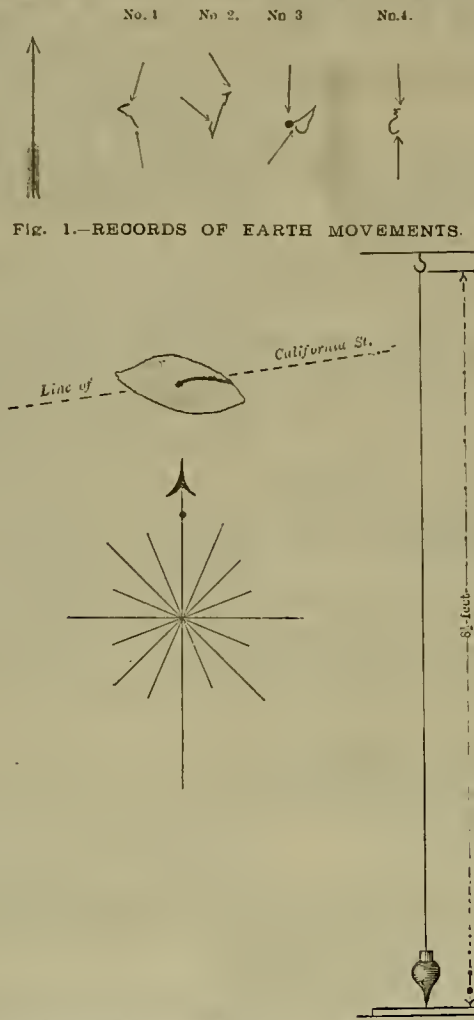


Fig. 2.—PLUMMET FOR RECORDING EARTHQUAKES.

SOUTH AND NORTH LINE OF CALIFORNIA STREET

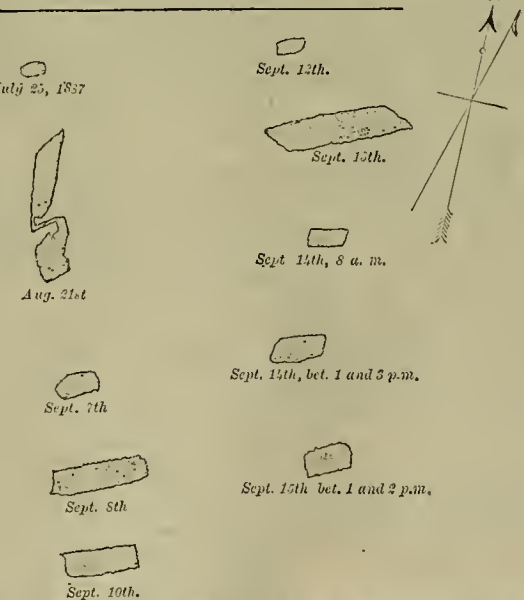


Fig. 3.—EARTH MOVEMENTS RECORDED BY PLUMMET.

still remains a large amount of material which in one way or another must be got rid of. In earlier times the common way was by open barge maintained at a presumably safe distance from the mill, and to which the refuse had to be conveyed, often at considerable expense.

In more recent times furnaces have been specially designed, into which, by the action of machinery, the refuse is constantly discharged as fast as produced in the mill. For a large mill the furnace must be very large, and is very costly. In one case in Ontario the burner is over 30 feet in diameter and has a total height of 120 feet. The lower part has suitable openings for admission of air, and for entrance for repairs when necessary. It is really an iron casing, made of wrought-iron

with heavy wire netting, the meshes being about one-fourth inch square.

This kind of a burner is only well adapted for large mills, as it must be of considerable height to insure safety, and the height necessitates a large diameter. The two things necessary in a successful burner are: first, the prevention of the escape of burning pieces or sparks of sufficient size to cause a fire; and, secondly, some means by which the heat generated may be dissipated without injury to the furnace itself, so that it might last for a reasonable time.—*Geo. C. Robb.*

BAND SAWS FOR LUMBER.—The recent introduction of the hand-saw in the lumber-mills of this State and in the northern forests has

afforded much economy in production. Band-saws were first used on a small scale for scroll-work, and it was believed at the outset that the principle could never be applied on a large scale. This, however, has been proved to be a false opinion. A hand-saw in use in a Tacoma mill saws heavy lumber for turntables and other purposes, and it matters not whether it be soft pine or the hardest seasoned fir, the few runs through the wood like a sharp knife through cheese. Nevertheless many of the old sawmill men now using circular saws that waste thousands of feet of log lumber annually are very slow to adopt the new device. It is said that there is no more conservative class of men to be found than the proprietors of the large sawmills in the Puget sound region. They have the idea that nothing that is not now in use by them can be successful, and are, to a great extent, opposed to newfangled notions. None of these men will put in a hand-saw unless it is at the expense of the manufacturers, being unwilling to make any experiments.

Evolution of the Saw.

Every instrument which the mechanic uses has a history. Some of them were brought into being by inventive genius, and required days and nights of wearying thought to complete the conception and to overcome imperfections. The simpler tools have been in use for centuries under one form or another—at first only rude suggestions of what they afterward came to be. Perhaps no tool has a more interesting history than a saw. According to a recent writer, saws have been discovered in Germany and Denmark which belonged to the bronze age. The metal of which they were composed was cast into a thin shaft and serrated by breaking the edge. Equally interesting discoveries have been made in this country.

It has been found that saws made of obsidian, which is a kind of glass produced by volcanoes, were used during the stone age in Mexico, and saws and knives of the same material have been found in the alluvial deposits of New Jersey, thought to have been sent thither from Mexico by the action of the water. The Phœnicians are among the earliest nations which are thought to have used the saw.

The scholar is not surprised to find a very pretty story accounting for the discovery of the saw in Grecian mythology. Here the inventor is said to have found the jawbone of a snake which he limited by joggling an iron plate. One day the nule of the inventor murdered him in a fit of jealousy, so the story goes, and if the thirty may be taken of filling out this little romance, by plunging one of the poor young man's own saws through his heart.

The Lacustrine and other early inhabitants of Europe are credited with having saws made of flint, and the native of the West India islands had saws made of notched shells. The Japanese saw is a curiosity. It is shaped something like a butcher's cleaver. The shank is drawn into the handle, which is flat, where it is secured by being wrapped with split cane. The teeth are described as being very narrow and pointed toward the handle. Some of the saws used by the ancient Egyptians are exceedingly rude and imperfect, consisting of long, thin blades, regged at the edges, and driven into rough pieces of wood. It is from such crude and inefficient implements as these that the modern saw has been developed. The law of evolution has been operative here, as the philosopher might say, as it has been elsewhere.

Records of Earthquakes.

Systematic efforts are now being made to record the earthquakes which occur in this State. Seismographs for recording the shocks are now in use in California at the following places: Two at the Lick Observatory, Mt. Hamilton (one of them very elaborate); one at the Cbatot Observatory, Oakland; two at the State University, Berkeley; one at Mr. Blinn's Observatory, Highland Park, East Oakland; one at Sntro Hights, and one at Mr. Jarboe's residence, Pine street, San Francisco. The instruments are self-recording, and the diagrams made are forwarded to Prof. Holden at the Lick Observatory.

We reproduce on this page diagrams of some recent earth movements as recorded by these instruments. No. 1 shows the movement recorded September 17th at 3:49 A. M. at the Cbatot Observatory. The point of beginning was at the north, as indicated by the small arrow, and the ending at the south, as indicated by the other small arrow. No. 2 was made October 5th at 4h. 41m. 30s. A. M. In this also the commencement was at the north end, and the completion of the shock at the point indicated by the lower arrow. This shows quite a movement, but the shock was noticed by very few people.

No. 3 is a record of an earthquake which occurred last week, October 24th, at 2h. 50m. A. M., and the diagram is from the Cbatot Observatory instrument. The point of beginning was as indicated by the upper arrow and

its ending at the point indicated by the lower arrow. The large arrow at the side of the diagram points north, so that the direction of all the movements may be understood. This last earthquake was noticed by a number of people, and the time was given to Mr. Bunkhalter, of the Chabot Observatory, by several observers. Mrs. Fox placed it at 2:50 A. M.; Mr. Wm. Ireland at 2:50:30, and Mr. Watson at 2:50.

No. 4 of the diagram shows the same earthquake as recorded on Mr. Blinn's instrument at Highland Park, East Oakland, about two miles from the Chabot Observatory. The time as given to him by Mr. Ireland was 2:50:30 A. M. This shock was evidently local, and the records of the two instruments show a very different movement. In Mr. Blinn's instrument, the movement is shown to have commenced at the south, and ended at the point indicated by the upper arrow.

We have already described and illustrated the seismograph in the PRESS. The instruments are made in this city by the California Electrical Works and are quite inexpensive. No skill is employed to use them. A plate of smoked glass is placed under the pointer which makes the record of the movement on that, and "blue-print paper" is used to obtain copies. The Lick Observatory will send a man to adjust the instrument so that all will be set to the same degree of sensitiveness in order that similar shocks will show similar results.

These movements which we have referred to were all small, and very few people could notice them. The diagrams are all about four times larger than the actual movement of the earth.

Mr. J. M. Kelley of No. 122 California street, in this city, has for some time made observations on earthquakes, using a very simple means for the purpose. The method is shown in Fig. 2. It is simply a suspended plummet beneath which is a smooth surface covered with fine sand. The point of the plummet moves the sand from beneath it when there is a movement of the earth, leaving marks which indicate the direction and extent of the shock.

Fig. 3 shows some of the records made by means of this appliance, last year, before the seismographs now in use were in place. Within a few months several movements were recorded. The recording instrument is in the second story of the building, which is on "made ground," on California below Front. The passage of heavily loaded wagons does not make any record on the appliance, notwithstanding the character of the ground in that vicinity. Of course this cannot give such accurate results as the seismograph, but the results are shown as a matter of interest in this connection.

ALASKA FISH.—The U. S. Fish Commission steamer Alaska has returned from an expedition to Alaska. The waters of Alaska were found to be teeming with fish of all kinds—cod, halibut, tomcod, black cod and pollock being particularly plentiful. One peculiarity was noticed, however, regarding the Alaskan banks, that is, that the water is comparatively shoal and the banks themselves long and narrow and seldom out of sight of land. Here the banks run parallel with the Aleutian group of islands and are about 100 fathoms below the surface. On the outer edge of the banks there is a very steep slope, the depth of water increasing suddenly to 600 fathoms or more. The cod here are the same as on the Newfoundland banks, but smaller in size, and the supply is practically inexhaustible. Up into the Behring sea the same state of affairs exists, and this latter place is the favorite fishing-ground of the San Francisco fleet, because the weather is better and there is less fog. For this reason the fishing vessels prefer to go a hundred or so miles more. Along with the codfish were found black cod and halibut, and also some red rockfish. The halibut of the far northern waters is small, and will be of no use for years to come, or until the larger fish farther to the south are exhausted.

STATE MINERALOGIST'S REPORT.—The annual report of the State Mineralogist has been completed and that official has taken the manuscript to Sacramento ready for the printer. The report this year will deal mainly with the gold mines of the State. Information has been obtained from all the counties by special assistants employed for the purpose by the State Mining Bureau.

THE COMMERCE OF PUGET SOUND, for the year 1888, will show a much larger total than in any previous year. Certain railroad facilities, which have lately become available, promise to make Tacoma an important shipping point for a large quantity of Oregon wheat. The advantage of loading there, as against Portland, has made the change, and it promises to be permanent and of growing importance.

Coast Industrial Notes.

THE output of the Oregon Iron and Steel Co.'s furnaces is now about 60 tons per day.

NEVADA COUNTY now produces a great deal of fruit, and a cannery is much needed.

SAN FRANCISCO has three trunk factories, employing 150 men. The annual product is valued at \$800,000.

THE Lewis & Clarke Lumber and Manufacturing Company of Astoria has made an assignment.

THE TANNERY of Faithful & Ryan on Twenty-sixth street, San Francisco, was burned on Sunday.

GLOVE FACTORIES IN THIS CITY.—Our County Assessor reports 14 glove factories in the city, employing 200 persons and turning out a product valued at \$250,000 per annum.

SAN FRANCISCO TANNERIES.—The annual product of the San Francisco tanneries is now \$1,100,000. There are 20 of them in the city. To tan 200,000 hides they use 4000 cords of bark and employ 250 men.

THE BUREAU OF CONSTRUCTION and repairs has completed the specifications for the necessary tools, etc., to equip Mare Island Navy-Yard, in accordance with the appropriation of \$100,000 made for that purpose in the Navy Appropriation bill.

NATURAL WOOL CLEANSING WATER.—The Virginia Chronicle says: It has been discovered that the water of Mono lake makes an excellent wool-cleanser, and during the past week one of the largest wool-buyers of San Francisco has been up looking after the same.

THE COAL MINERS' STRIKE at Newcastle, N. S. W., still continues, and consequently there is no immediate chance of a fall in the price of coal here. The steamship companies at Adelaide are burning wood instead of coal for an experiment, and thus far with satisfactory results.

THE California & Mexico Steamship Company has been absorbed by the Oregon Improvement Company, thus giving the Guaymas trade to the Pacific Steamship Company. The price paid has not been made public, but it is understood to be something like \$200,000 for the steamers Mexico and Newbern.

HARNESS-MAKING IN SAN FRANCISCO.—The directory reports 57 firms in the harness trade in this city. The County Assessor reports 34 firms engaged more or less strictly in the manufacture of harness and saddlery, employing 375 men and turning out a product of \$1,200,000 annually. Main & Winchester, harness makers, employ 225 men.

THE STANFORD UNIVERSITY.—About 250 men are at present at work on the Leland Stanford Jr. University, and the buildings are fast assuming shape. The buildings will be roofed with tiles, which are manufactured in Ohio. About 255,000 pieces have already been received, and several carloads are en route. Work will shortly be commenced on the school buildings.

THE BIG HOTEL AT SAN JOSE—the Vendome—has been completed and is now ready for its furniture. The building is a stately edifice with a frontage of 300 feet and a broad wing extending from the back some 200 feet. It is four stories high, built in the substantial style of modern architecture, with broad porches similar to the famous Del Monte at Monterey.

SHUTTING DOWN FURNACES.—The Eureka Con. and Richmond Companies at Eureka, Nev., have both concluded to close down their furnaces on account of the threatened Government timber suits. They are at present purchasing no ore except what has been contracted for. This is not the way in which the National Government should treat our industries.

AMONG the cargo of the steamer Al Ki which sailed on Saturday for Vancouver, were in transit for Boston 30,950 pounds beans and 72,816 pounds wool, value \$14,100; for Concord 21,134 pounds wool, value \$8450; for Great Falls 60 boxes raisins, value \$100; and for New York 587 cases canned fruit, value \$2350.

THE International Brotherhood of Boiler-makers and Iron Shipbuilders have issued a notice to all manufacturers of steam boilers that after November 1, 1888, boiler-makers will not perform any labor on boiler heads that have been flanged in the East, or on partly constructed boilers that may have been sent here from any foreign country or the Eastern States. They want all work for the coast done on the coast.

CALIFORNIA LEATHER EXPORT.—In 20 years the leather-export trade of California has increased from less than \$100,000 to about \$700,000. Japan has always been the best foreign market for our tanners, but shipments are made to Australia, Asiatic Russia, China, France, British Columbia, Hawaiian islands and Mexico. We still import more or less leather, despite

the quantity and variety made in California. These imports, however, are mainly confined to the finer and more costly descriptions.

A HOTEL AT POINT LOBOS.—Adolph Sutro is about completing plans for the erection of a large hotel at Point Lobos, which promises to be a very popular resort, as the weather there is always pleasant. The Sutro Heights are close at hand, and this, with the attraction of the new hotel, Mr. Sutro believes, will bring a great deal of travel that way. The ground is already cleared for the building.

LARGE RESERVOIR AND DAM.—The Lassen Advocate says: "The Northern California Development Association has commenced work on what will be, when finished, the largest reservoir in Lassen county. The proposed dam is 2700 feet in length, and will, it is calculated, back water over 900 acres, five feet deep in the shallowest part. The water from the reservoir will be used to reclaim a tract of desert land of about 20 sections, or nearly 20,000 acres, which will, we are informed, be cut up into small farms and sold to settlers."

COIN FROM SYDNEY.—The steamer Alamsda, from Sydney, brought 62 boxes gold coin, amounting to \$294,911 12 41, equal in American money to \$1,274,555. This is the largest amount of specie imported this year. It is believed that this money has been sent here to buy grain bills on England, in preference to direct shipments of specie to that country. This has been the case with other similar consignments. The sovereigns go to the Mint on Fifth street, and when they leave that institution they will go forth as American eagles.

THE McCLLOUD RIVER SALMON-STATION in California, which has always held the world's record in taking salmon eggs, succeeded this year in taking only a million and a half eggs. But either the McCloud River Station or the Clackamas Station, being both wonderfully adapted by nature for taking salmon eggs, could easily secure 10,000,000 eggs a season, if the parent salmon had half a chance to get up the rivers. As it is, the salmon are so unmercifully netted and trapped on their way up to the stations that it seems almost a miracle that any of them get there alive.

THE SCHOONER ACME, now lying at La Rue's wharf, is an example of what perseverance can do. This little vessel was built by Captain Jorgensen, her captain and owner. She was built at Soli Slaw, quite a distance from the sea, and there is a photograph of her as she lay in the stocks, the hulkwood growing all around her. Captain Jorgensen was helped by the ranchers and others in his work, and has turned out a very substantial vessel. She is to be fitted with engines as a steam schooner. Her dimensions are: Length, 82 feet; beam, 22 feet; depth of hold, 7 feet.

FIFTEEN COTTAGES have been built at Emerald Bay, Lake Tahoe, by Dr. P. T. Kirby. A large hotel will be built next season. Next year he will have his place fitted up in great style. An elevator will take visitors to the top of a cliff 212 feet in height that stands back of his place. The elevator will be run by a Pelton water-wheel four inches in diameter under pressure of a vertical column of water 800 feet in height, and the same Pelton wheel will drive a dynamo by means of which all the cottages, the hotel, the cliff, and the bay will be lighted up of nights.

MILLS ON THE CARSON RIVER.—The Virginia Enterprise says: Although the mountain streams have received no great increase of volume from either rains or snows yet—through the decrease of evaporation—the flow of water in the Carson river is gradually increasing. The mills are beginning gradually to drop the stamps so long hung up. The mills along the Carson river at present in operation are the Mexican, partially, the Morgan on steam, the Vivian hy water, and the Eureka working 20 stamps out of 125. The Brunswick and Santiago are expected to start up Nov. 1st.

TAYLOR'S PAPER-MILL BURNED.—A dispatch from Taylorville, Marin Co., dated Oct. 28th, says: At 2 o'clock yesterday a fire broke out in the finishing-room of S. P. Taylor & Co.'s paper-mill, completely gutting it, destroying in the neighborhood of \$6000 worth of paper and damaging the building about \$4000 or \$5000. The fire pumps, which are always ready, and Schenck's patent reels and hose, saved over \$150,000 worth of property, with the help of the men, and especially of the neighbors. How the fire originated is not known, but it was probably from an exploding lamp. The loss is fully covered by insurance.

THE EL DORADO SLATE CO. has recently incorporated and elected the following officers: President, H. C. Partridge; Vice-President, P. J. O'Connor; Treasurer, Bank of California; Secretary, W. Aug. Knapp; Directors, C. A. Warren, Chas. T. Bohen, W. Aug. Knapp, H. C. Partridge, P. J. O'Connor. The lands of the Co. consist of 180 acres, situated on either side of Big canyon, which is the longitudinal gorge running north and south and parallel with the cleavage of the slate, which will give great advantages, in point of economy, in quarrying. The Co. intend opening a quarry on the east side of the canyon, near the mouth of the Big Tunnel, and instead of running end-

wies on the slate, they will make their opening parallel with the cleavage. This quarry will be about one and a half miles from the railroad depot at Placerville. The hill on the east side of the canyon being very steep, it will not take long to get an immense face opened up at this point, where shops will be erected in such close proximity to the quarry that the expense of handling will be nominal, besides being near a stream which will furnish ample water-power for all purposes.

PROSPERITY OF UTAH.—Caleb B. West, Governor of Utah, in his annual report to the Secretary of the Interior, estimates the population of the Territory at 210,000, an increase of 66,000 since 1880. The manufacturing industries of the Territory are said to be in a satisfactory condition, and, taken as a whole, the Territory has been progressive and prosperous. Owing to an unusually light rainfall during the season, dry farming has not been a success, but irrigated land has produced abundantly. The aggregate of mineral products of the Territory for 1887 is given as \$7,637,000, of which \$5,975,000 was silver. Labor, the report says, has been in demand during the year. Nearly all trades are well paid and fully employed.

THE CITY FRONT TRAFFIC.—A. N. Towne of the Southern Pacific Co. in a letter to the Harbor Commissioners says: I did not understand from you, during our conference, that you had fully matured plans for laying rail tracks north of Market street; but with the great natural increase of freight traffic in this city it will not be a great while before a double-track freight road around the city front will be necessary. In view of this and the safe management of the enormous passenger business centering at the foot of Market street, which during the year 1887, by our ferryboats alone, amounted to, in round numbers, 9,717,000 persons, a plan for a depressed road along this section of the waterfront would seem to be necessary.

GROWTH OF ARIZONA.—O. M. Zolick, Governor of Arizona, in his annual report to the Secretary of the Interior, states there has been, during the year, a steady progress in the growth and development of the Territory. The population has largely increased. Indian depredations are a thing of the past; life and property are now safe and law and order are supreme. During the year 295,841 acres of public land were entered by settlers, 200 miles of canal for irrigation were made and 100 miles additional will be built during the present year. The importance of Congress authorizing a hydrographic survey of the Territory to demonstrate the feasibility of artesian wells and water-storage reservoirs is dwelt upon at length. The yield of gold and silver last year was \$5,771,555.

THE OAKLAND GASLIGHT AND HEAT CO. is at present erecting a structure of some importance on First street, between Jefferson and Grove streets. The building, which is to be of brick, has a solid concrete foundation two feet in thickness, and carried down on the hardpan 11 feet below the grade. The lower walls will be constructed of piers 4x8 feet and 26 inch arches will span the spaces between them. The building occupies an area of 56x127 feet and will be two stories in height; the lower story 16 feet and the upper story 14 feet in the clear, and be surmounted by a four-foot fire-wall. Twenty-four dynamos will be placed on the second floor, and they will be driven by two engines of 500-horse power and one engine of 300 horse power. The smokestack of this building will be 16 feet in circumference at the base, and it will rear 90 feet aloft.

SALMON IN ALASKA.—The U. S. Fish Commission steamer Albatross reports salmon to exist in almost inexhaustible quantities in Alaska, at one place the weight of the haul breaking the seine. The fish, as a rule, are smaller than those of the Columbia river, but one species, known as the king salmon, attain a weight of from 80 to 140 pounds. The salmon-canning industry in Alaska, it is predicted, will grow to gigantic proportions in a few years, and will completely do away with the business on the Columbia. Not only are the fish more numerous, but they are more easily taken. Of late canners on the Columbia have paid as high as \$1.50 apiece for fish, while in Alaska five cents each is about the ruling price paid for them at the canneries, and more are offered than can be worked up. So plentiful, indeed, were they, that the sailors on the Albatross used them for bait while codfishing.

AN OVERFLOW DAM.—Work has been commenced on an overflow dam in "Paradise cut," which makes out from the San Joaquin river about 15 miles south of Stockton. The work is done under the supervision of Engineer Tucker, the Government engineer, Major Huer, having charge of the work. The dam will be 225 feet long and 40 feet wide, and the top will be eight feet above mean low-water mark. The materials will be timber with earth filling. Paradise cut carries an immense body of water, and for many years has been of serious injury to the navigation of the upper San Joaquin, and has interfered with the navigation of the river from the cut northward by diverting the current of water and allowing the stream to fill up. This is an important piece of work for Stockton and the county, and has been recommended for many years by local and Government engineers.

Native Lead.

(Written for the Press by HENRY G. HANKS.)

Many years ago the writer received a specimen of metallic lead said to be native, and to have been found in the Jersey mine, Battle Mountain, Nevada.

Knowing native lead to be an uncertain mineral, reference was made to the authorities; which led to the specimen being set aside as unworthy of a place in his mineral collection.

Quite recently a specimen was sent by Prof. Th. Hjortdahl of Christiania, Norway, which was labeled native lead, Paj berg, Sweden.

Coming from so high an authority, attention was again called to the subject, which, on further study and investigation was found to be so interesting to the writer that it was thought worthy of placing before the intelligent readers of the MINING AND SCIENTIFIC PRESS.

The Battle Mountain specimen was looked for and found where it had lain for so many years, in disgrace and dust, cleaned, a new label written, and both specimens subjected to microscopical, physical, and chemical examination. The Nevada specimen weighed 33.03 grammes, was thin, but of irregular thickness; one side was smooth, and showed evidences of having been attached to some comparatively even surface; the other side was rough, uneven, and not only showed several minerals, the result of decomposition of the metal, but was coated with a dark incrustation. It did not differ materially from pieces of lead taken from old buildings and baths in Ancient Rome and Pompeii. The superficial minerals seemed to be silica with cerussite, minium and litharge, but the point of a knife applied with gentle pressure at any part, gave a shining streak of metallic lead. A portion being cut from the mass and passed between rollers, produced a ribbon of malleable lead, which, when melted on charcoal, gave the characteristic coating. An assay proved the absence of silver, which is considered a remarkable fact.

The Swedish specimen weighed 6.38 grammes; was irregular; showed no smooth surface. With the same magnifying power, the inequalities of surface seemed more minute, but when more highly magnified it was found to be similar to the Nevada mineral, with the addition of certain bluish, brilliant crystals of a foreign mineral, the exact nature of which could not be determined optically. Otherwise, it gave the same reactions, but was found to contain 0.25 per cent of silver.

As far as known, native lead—or what was supposed to be such—was first obtained in Monmouthshire, in England, in the year 1772, although the mineral was mentioned by authors before that date. The specimen was dug up by Dr. Morris, while laying drains. It was found at no considerable depth, in small granules, which flattened under the pestle. The discovery was first announced in the Philosophical Transactions, vol. 63; 1772; folio 20. No mention is made of a mine; but the find was in an open field. From that time to the present, it has been a question if the substance was really native lead, and if lead does or can exist naturally in a metallic state. If the question can be answered in the affirmative, it must be one of the rarest of minerals.

The following seem to comprise all the localities where native lead has been found:

Alston Moor, Cumberland, England.—Allen (Thos. Allen, an English mineralogist), discovered metallic lead in a small vein, one inch thick, in limestone, but doubted its genuineness. It was found in small globular masses, imbedded in galena, and a suspicious, sluggy substance, and associated with minium, crystals of sphalerite and quartz and mealy anglesite. Nicol describes the matrix as a feed mass, resembling slag.

Anglaise River.—This locality is placed in Ohio by one writer, and in North America by another. Both are frequently referred to. The deposit containing the supposititious lead is described as traversing hexahedral lead glance in narrow veins.

Bohemia.—Only mentioned.

Bristol, England.—In carboniferous limestone. This locality is given by Nicol and Phillips.

Chili.—"Mr. Gleig of England has recently found in a mass of meteoric iron received from Terapaca, Chili, small globules of meteoric lead in a metallic state, with iron, magnesia and phosphorus combined. This is, we believe, the first instance in which metallic lead or any of its compounds have been found in meteoric masses."—*Annual of Scientific Discovery*, 1887, Vol. 332.

Carthagena, Spain.—This locality is frequently referred to. Davies says the mineral is found in clay slate. Nicol affirms that it was in deserted mines and is doubtful.

Kenmare, Ireland.—This locality is given by Nicol without remark. Dana describes it as being in thin sheets in rad oxide of lead near a basaltic dyke.

Languedoc, France.—Described by Gensanne, "History of Languedoc." Vol. 3, Fol. 208. Gives Vivaria as the locality, and describes considerable deposits of earthy lead in which native lead is found in globules from the size of a pea to a musket-ball and larger; but Hany, "Traite de Mineralogie," 1801, Vol. 3, Fol. 452, says the director of the mines of Villefort, son of the same mineralogist, visited the locality, which he studied with great interest, and certified that in his opinion the lead thought to

be native was the work of man, because he found litharge and other indications of art, and what was believed to be native lead was really artificial.

Madeira.—This locality was discovered by Rathke, a Danish savant. He presented specimens to Haüy, who came to the conclusion that they were natural. The metal was found in a soft lava in considerable quantity. Mobs says the formation is considered by some to be slag.

Mexico.—This locality is given by Pisani. It is more than likely this metal is the result of ancient reduction works, for reasons given elsewhere.

The Monmouthshire locality has been described elsewhere.

Salzach River, Austria.—Only mentioned as being found in auriferous sands.

Sweden.—Locality given by Pisani. The piece sent by Prof. Hjortdahl is from that country. The specimen has been described elsewhere.

Vesuvius.—That native lead has been found in the lavas of Vesuvius is only mentioned.

Many works, both ancient and modern, have been consulted in preparing this paper. Every author expresses doubts as to the existence of native lead, and some do not mention it. The following writers refer to this mineral, as quoted:

Pettus, Joba, "Fleta Minor," 1683, does not mention it.

Neuman, Casper, 1755, "Chemical Works of," "Lead is sometimes found in the earth native or in its metallic form, although rarely pure."

Henckel, J. F., "Flora Saturnisens," 1772, mentions it as having been found in a mine. He was a noted and able chemist and mineralogist, and was made Chancellor of Mines by Augustus II, King of Poland.

Cronstedt, A. F., "System of Mineralogy," 1758.—"I know of no native lead, and all that has been said on that subject is liable to remarkable restrictions."

Pryce, Wm., "Minerologia Cornubiensis," 1778.—"It is seldom found malleable or purely metallic, for what have been taken for specimens of native lead have produced very often three parts in four of fine silver, from which many have supposed that there is no such thing as native lead. I have, however, seen two specimens of it, in the possession of Mr. Bannalack in this county."

Kirwan, Richard, "Elements of Mineralogy," 1734, mentions the Monmouthshire locality and refers to Phil. Trans. 1772; also to Vivaria and Languedoc, France, as other localities.

Babbington, William, "New System of Mineralogy," 1779, says: "Lead is so seldom met with in its native state that by many mineralogists its existence has been called in question. But that it does now and then actually occur is proved by the specimen No. 11 from Brittany." He, too, refers to the Monmouthshire discovery.

Hany, Abbe Rene, "Traite de Mineralogie," 1801, refers to the specimen of metallic lead in the collection of Richter as being lighter and less malleable than pure lead, discredits its genuineness and thinks it is a slag from an ancient furnace, but concludes that the Madeira lead is natural.

Werner, A. G., "Treatise on the External Character of Minerals," 1805. Native lead is not mentioned.

Kidd, J., "Outlines of Mineralogy," 1809, alludes to the occurrence of native lead in the following words: "The existence of native lead has not yet been satisfactorily ascertained, and its ores are so easily reduced and have been so commonly worked in all ages that great caution would be requisite in examining local circumstances, in order to determine whether a specimen supposed to be native was really so or only a portion of the ore that had been smelted at some former period." He refers to the Madeira lavas with this qualification: "But the peculiarity of the situation may seem to explain their presence."

Kirwan, Richard, "Elements of Mineralogy, Third Edition," 1810. The existence of lead in this state is very generally denied, and from the easy calcination of this metal by air and moisture, it must be allowed to be somewhat doubtful, yet to deny it absolutely is in this, as in many other cases, rather rash, particularly as the specimen found in Monmouthshire has all the appearance of being in a perfect metallic state, and no solid proof, deserving attention, or even a well-grounded suspicion of its having been produced by art, has been adduced.

Delametherie, J. C., "Lecons de Mineralogie," 1812, refers to recent discoveries in volcanic materials, which he assumes are reduced by subterranean fires, and to Monmouthshire, and adds, "but these facts are not established."

Jameson, Robt., "System of Mineralogy," 1816. Native lead is not mentioned.

Cleveland, Parker, "Elementary Treatise on Mineralogy and Geology," 1816. "Several instances of the occurrence of native lead have been published, though in but few of them does the fact appear to be well established." Specially refers to the Madeira locality.

Thomson, Thomas, "A System of Chemistry," Book 3, Minerals, 1818. Native lead is not mentioned.

Blakewell, Robert, "Introduction to Mineralogy," 1819. "Lead has never been found native, unless we except the particles of metallic lead which, according to Brongniart, are said to be imbedded in lava in the island of Madeira." Mobs, Frederick, "Treatise on Mineralogy,"

1822. "Metallic lead as it occurs in nature is almost in every instance accompanied by such substances as betray its being once in a state of fusion." He refers to Madeira, Anglaise river, Carthagena, Spain, and Alston, Cumberland, England.

Beudant, F. S., "Traite Elementaire de Mineralogie," 1830, says: "Lead in a metallic state is known," etc. He then gives the usual localities, Vesuvius, Madeira, Alston, Bohemia, but does not express an opinion.

Thomson, Thomas, "Outlines of Mineralogy, Geology and Mineral Analysis," 1836. "It has been doubted by mineralogists whether lead occurs native in the mineral kingdom." He refers to the Monmouthshire locality and expresses doubt, and to the Madeira lavas—quoting Phillips—and finally to the Alston vein traversing limestone, without expressing a decided opinion.

Gmelin, L., "Hand-book of Chemistry," 1843, follows his statement that it is found in nature with an interrogation point.

Dufrenoy, A., "Traite de Mineralogie," 1847, refers to native lead and thinks its existence is doubtful, except the Alston Moor discovery, which he believes is genuine.

Nicol, James, "Manual of Mineralogy," 1849, mentions Madeira, Carthagena, Anglaise river, Alston Moor, Bristol and Kenmare. Expresses no opinion.

Phillips, William, "Elementary Introduction to Mineralogy," 1852. "Said to be found in lava in Madeira. In carboniferous limestone in Bristol, Kenmare, Ireland, and containing silver, in auriferous sands of Salzach."

Pisani, E., "Traite Elementaire de Mineralogie," 1875. "This rare mineral is found in small quantities in Mexico and Sweden."

Raimondi, A., "Mineraux du Prou," 1878. Mentions its occurrence with grains of galena at Santa Barbara Mountain, Huancavelica. Says the specimen he examined was composed of three distinct minerals—malleable grains of metallic lead, a yellowish white scoriaceous mineral, and galena. Being found at the summit of the mountain, in a very small mass, he thinks it improbable, if not impossible, that they are the ruins of ancient metallurgical operations.

Davies, D. C., "Metalliferous Minerals and Mining," 1881. Mentions the stereotyped localities, and "in metallic-iron in Chile."

Not only have the most noted writers on mineralogy doubted the existence of native lead, but mining experience in California has shown that metallic lead of undoubted artificial origin is often found under circumstances leading to the opinion that it was native.

The pioneer miners of California found

Small Discs and Globules of Lead

In their clearups. It was at first supposed to be native, but was soon discovered to be shot and pistol bullets, sent by the miners themselves after quail and jack-rabbits. The discs were the same missiles flattened against rocks intercepting their flight. The specific gravity of lead is such that it soon sinks in the earth, and finds its way to the sluices, where it contaminates the mercury and causes the miners untold annoyance. When the rich placers became impoverished, claims consolidated, and worked by the hydraulic process, enormous quantities of earth washed down through the sluices and the concentrations treated to a general clean-up, lead many pounds in weight was always found with the gold, from which it was necessary to separate it, with considerable and vexatious loss of time.

It is reasonable to suppose that the accounts which frequently appear in print to the effect that native lead has been discovered in auriferous sands are mistakes, arising from the same cause. May it not be that the globules of lead found in Monmouthshire and Madeira mentioned elsewhere were shot or bullets?

It is a well-known fact that the inhabitants of Mexico and Arizona had made considerable progress in metallurgy. We find lead furnaces in ruins, and piles of litharge and slag, where all other signs are obliterated. For this reason we do not consider litharge a natural mineral on this coast, although frequently found. In such slugs the presence of metallic lead is most likely; this may account for the Mexican locality referred to by Pisani. What is true of the ancient races of America is true of those of Europe, and it is probable that metallic lead artificially produced is frequently mistaken for native metal; that most, if not all, instances given by authors are doubtful, and that the existence of native lead has not been proven.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

WEED & KINGWELL of this city have melted up the three old bells which have been in the old Mission church at Santa Cruz for many years, and will make from the metal one 1500-pound bell. The original bells were made in 1809.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING OCT. 23, 1888.

391,734.—GATE—A. H. Broad, Berkeley, Cal.
391,511.—CABLE GRIP—Clement & Watriss, S. F.
391,693.—KEYHOLE GUARD—J. P. Dandamis, Virginia, Nev.
391,523.—WATER-WHEEL—W. F. Englebright, Nevada City, Cal.
391,527.—STAMP GUIDE—J. A. Gowan, Butte, M. T.
391,709.—BOTTLE STOPPER—B. Hegele, San Jose, Cal.
391,475.—IRRIGATING HYDRANT—W. Lacy Jr., Los Angeles, Cal.
391,554.—HAND TRUCK—J. G. Parker, Tacoma, W. T.
391,560.—HAND TRUCK—Sanders & Rafferty, Reno, Nev.
391,498.—ROAD SCRAPER—J. H. Wiles, Afion, Cal.
391,500.—NEEDLE AND TWINE CUTTER—F. E. Wood, Yucca, A. T.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

STAMP GUIDE.—John A. Gowan, Butte City, M. T. No. 391,527. Dated Oct. 23, 1888.

This is a guide for the etamp stems of quartz batteries, with a clamp by which it is held and adjusted with reference to the etamp stem and guide rail. The guides are made of hardwood in two halves. They are usually secured together and to a guide rail by bolts with nuts, and the constant jar and shaking of the stem makes it difficult to keep them tight. Moreover, the bolts and nuts must be removed to take out the stamps for repairs. This new invention is designed to provide an easy, quick and reliable means for securing the two halves together, adjusting them for wear and attaching them to the guide rail so that they may be easily removed when desired. The two halves are made tapering from the center toward both top and bottom, and at each end is fitted a clamp which incloses the front and two sides. The clamps are leveled to correspond to the level of the guide. The clamps are connected in front by a hand-screw, so arranged that by a single turn the clamps will be drawn toward each other upon the inclined bushing, and will then draw the bushing together and hold it firmly in its place in the chair. To remove the clamp stem the screw is turned out of the clamp nuts and the bushing may be taken out. The device is quite simple and convenient.

WATER-WHEEL.—Wm. F. Englebright, Nevada City. No. 391,523. Dated Oct. 23, 1888.

This is an improvement on the class of "hurdyurdy" wheels. It consists in the novel construction of the buckets and their attachment upon the rim of the wheel so as to project alternately upon opposite sides of the rim, the stream of water being delivered into the inner side of one bucket and discharged from the outer side of the bucket by reactionary force and into the inner side of the next bucket so as to be discharged from the opposite side of the wheel as it escapes from this bucket. By this means the inventor is enabled to throw the whole volume of discharge from the nozzle in a solid stream into each bucket alternately, and as it is not split or broken by dividing the bucket, the whole power is brought upon the bottom of the bucket, and the whole reactionary force of the escaping water also acts upon it. By reason of the alternate arrangement of the buckets the water is discharged upon one side of the wheel and then upon the other, so that neither of the buckets interferes with the free discharge of water from the one behind it.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

CALIFORNIA HEALTH FOOD CO., Oct. 26. Capital stock, \$10,000. Directors—F. Marty, L. Martv, F. J. Murty, C. and M. Moses.

BUENA VISTA M. CO., Oct. 29. Capital stock \$1,000,000. Directors—W. F. Myer, W. K. Dietrich, George A. Bill, S. Don Pattee and H. L. Cox.

ALASKA CO-OPERATIVE PACKING CO. Capital stock \$5000. Directors—Geo. Chapet, Joseph Frezer, John Harris, W. J. C. Andley and F. J. O. ff.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

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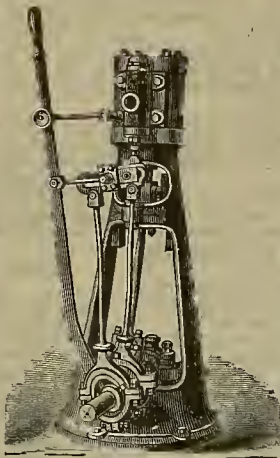
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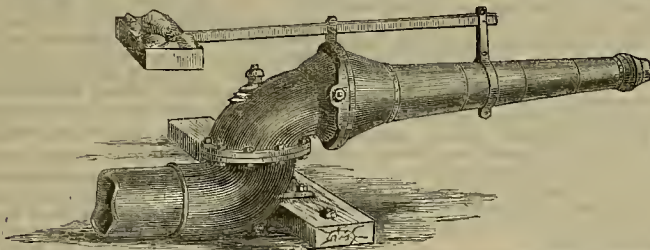
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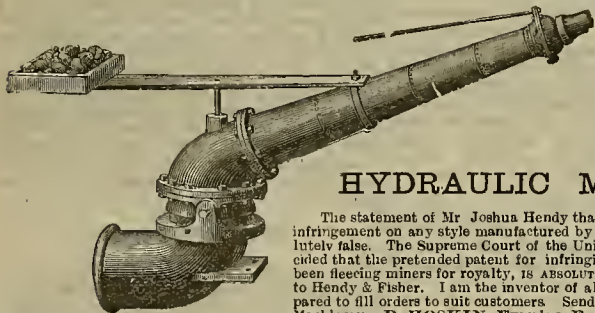
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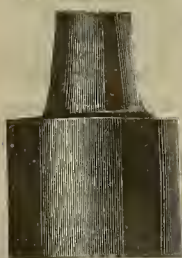
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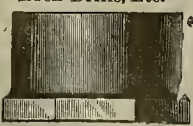
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HYDRAULIC MACHINE.

The statement of Mr Joshua Hendy that any style of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleeing miners for royalty, is absolutely void, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. R. HOSKIN, Empire Foundry, Marysville, Cal.



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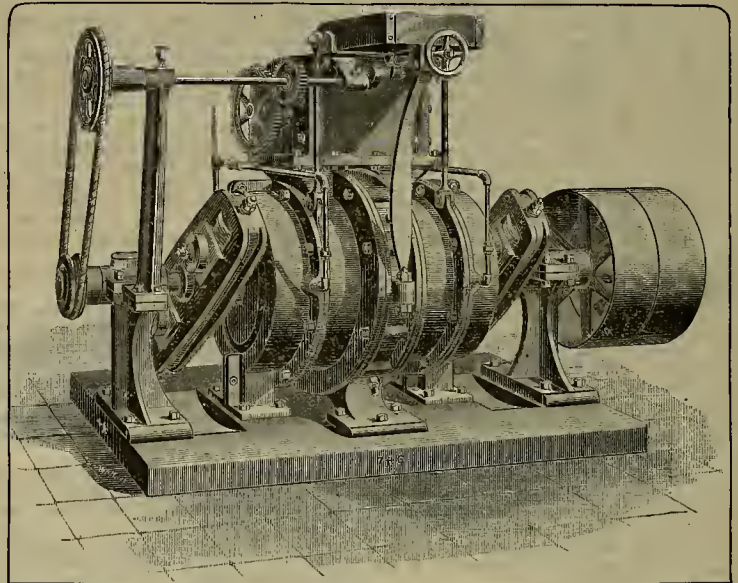
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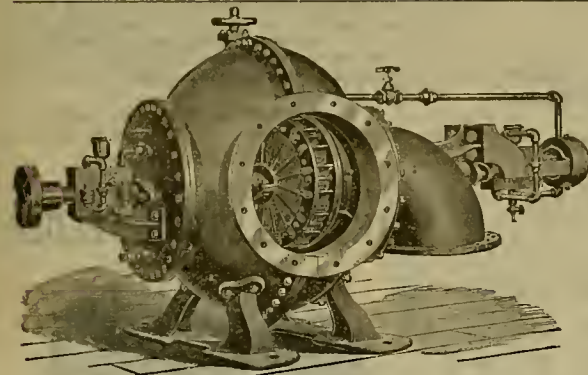
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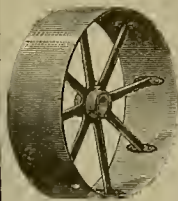
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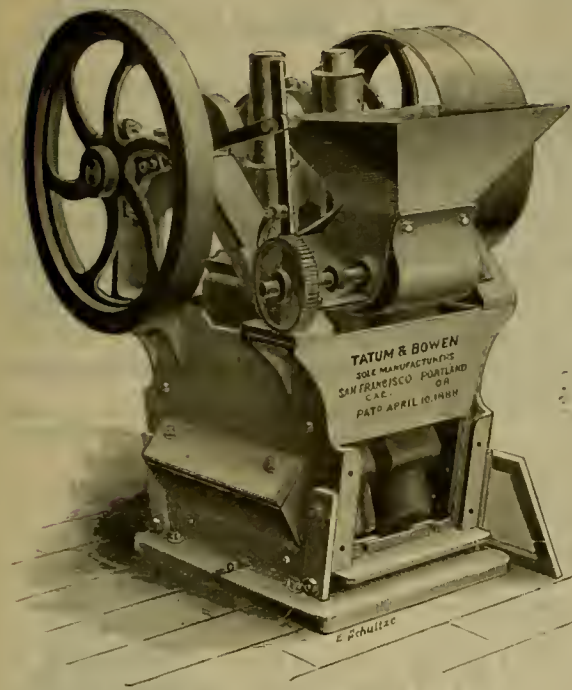
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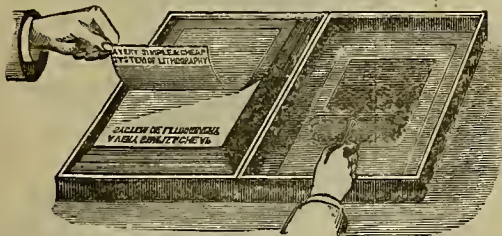
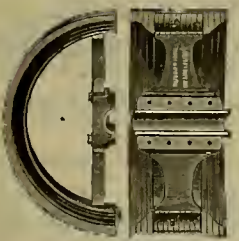
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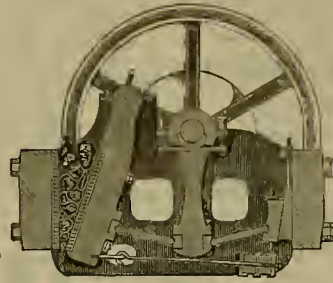
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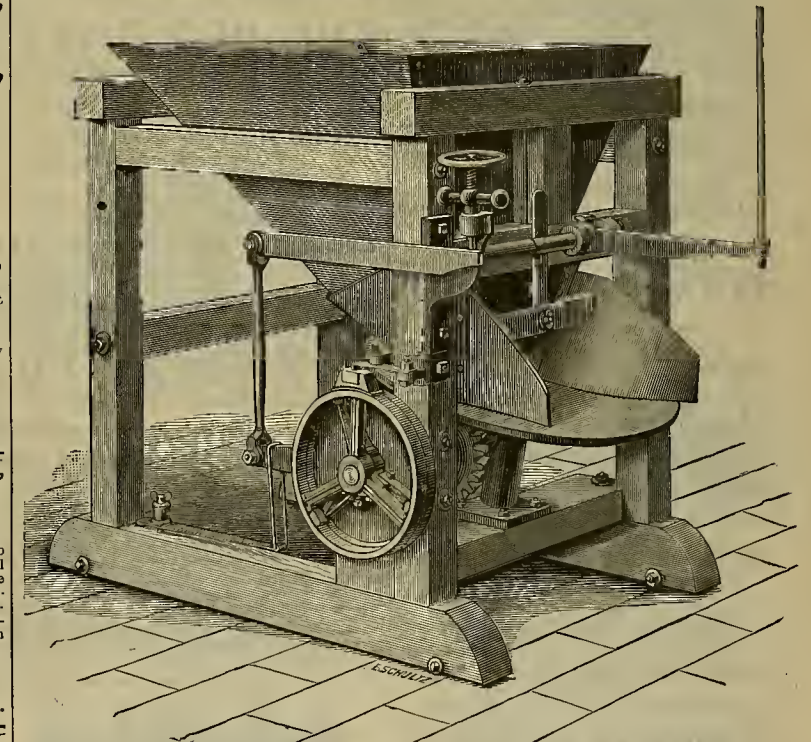
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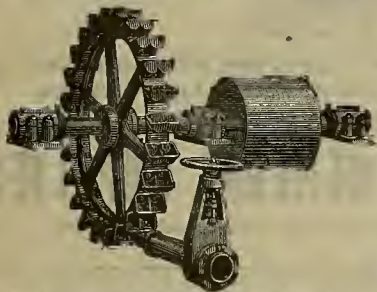
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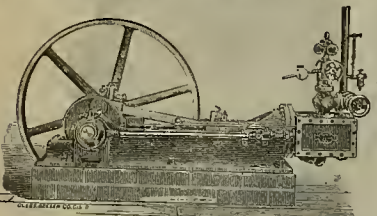
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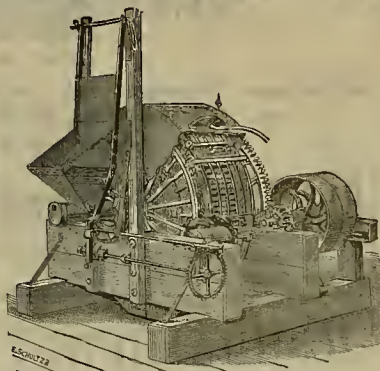
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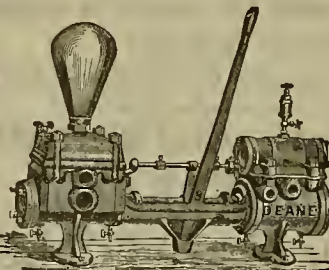
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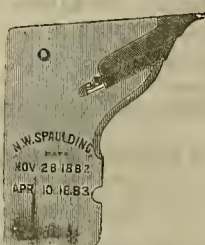
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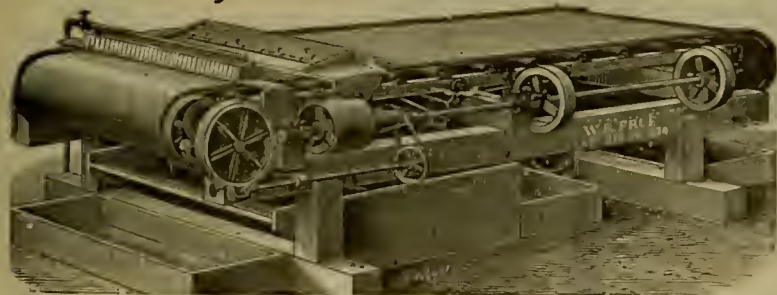
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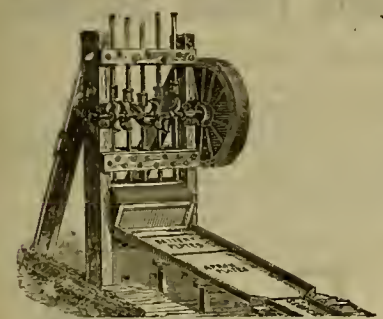
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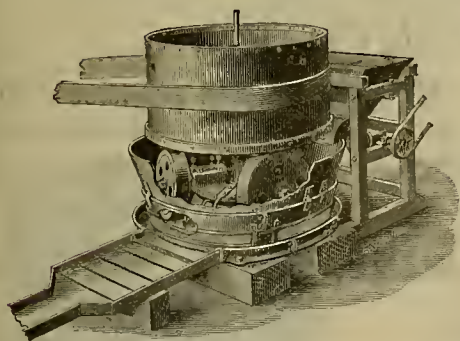
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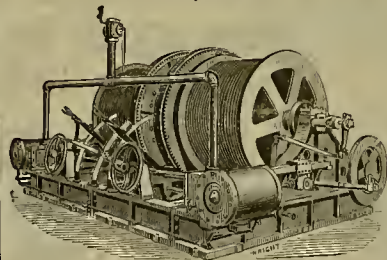
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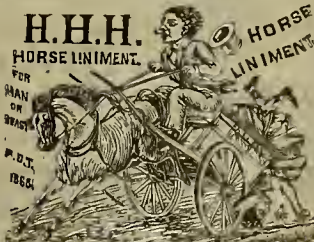
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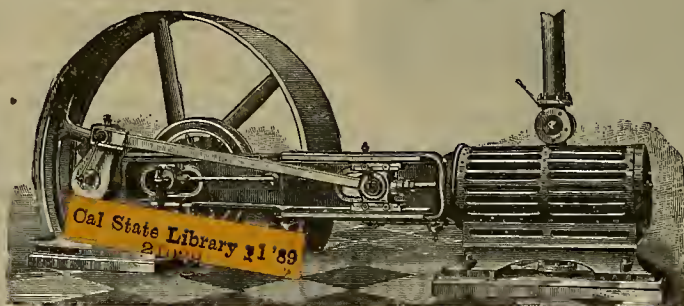
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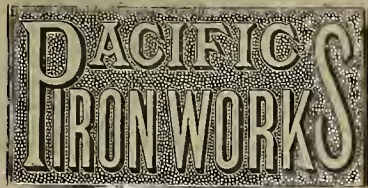
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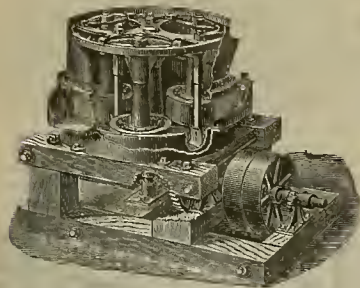
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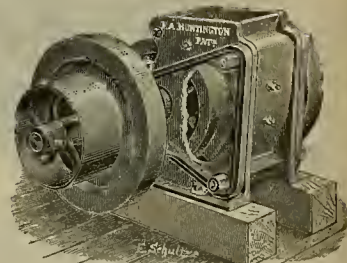
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SAN FRANCISCO, SATURDAY, NOVEMBER 10, 1888.

VOLUME LVI
Number 19.

Mineral and Agricultural Lands.

In another column we publish a letter from the Register of the Sacramento Land Office commenting on some of the statements made recently in the PRESS on the above subject. The matter of expense of contests to which we referred did not mean expenses of fees, but expenses incident to traveling to and remaining at the land office. Mr. Hetzel's suggestion that miners apply for patents is a good one and should be followed, as we have frequently urged.

In the last paragraph of his letter our correspondent acknowledges that frauds occur in men taking up lands as agricultural and afterward disposing of them as mineral. We know of dozens of instances of such action. When the Register and Receiver have substantial reason to believe such fraud to exist, final proof is not accepted. But how are they to have this substantial reason? Unless some miner is interested he will not go to the trouble to go to Sacramento to furnish proof. This is just the point we make. The mineral lands are being taken up as agricultural to the detriment of the mining industry. Unless there is a conflict there is no one to oppose the agricultural claimant, and the land goes out of the mineral domain forever.

In the series of articles recently published in the PRESS, the methods adopted have been described. The result is, large amounts of mineral land have been taken up as agricultural, and mining claims on the land afterward sold. This is all wrong. If no one opposes the agricultural claim it goes through, and no one dares unless he is directly interested.

People take up agricultural land alongside of mines, in what is really mineral ground. Then they can and do wrong the miner in one way or another. A case in point is that of J. H. Drummond, who has asked the U. S. Circuit Court for perpetual injunction restraining the Ilex Gold Mining Co. of London from operating the Tiger and Anglo-Saxon mines in Calaveras county. The complainant alleges that he owns valuable fruit lands on three sides of these mines, and that in working them the defendant has built ditches and roads through his land, and thrown great quantities of water and debris upon it, unfitting it for tillage. He prays that the defendant be forever restrained from repeating said acts or asserting any right to do so. It seems that the land, according to a local paper, would not bring Government price for other than mining purposes, yet a quartz mine is enjoined from working. It would be interesting to know how this mining ground was acquired as agricultural.

In another column is given a decision on a case just tried before U. S. Circuit Court Judge

Sawyer. The chief point of issue was whether or not miners may follow mineral vein outside of their own boundaries into land supposed to be agricultural. Judge Sawyer decides in the negative.

If people are to continue going into the mineral-land regions and taking up such land as agricultural, they are not only restricting the area for prospecting, but are hedging in actual working mines with such difficulties as are ap-

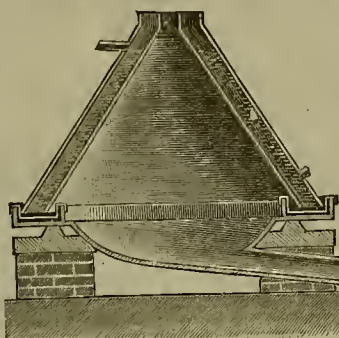


Fig. 1.—IMPROVED IRON STILL.

Iron Still for Sulphuric Acid.

In Mr. Adams' paper, from which we have been quoting in the last few numbers of the PRESS, he considers the advisability of combining the work of the two metals, namely, the addition of one or two iron stills of late type to the existing platinum plants. In this connection, he says he is aware that no successes, on a large and practical scale, are yet publicly

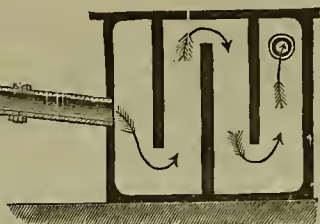


Fig. 2.—IMPROVED IRON STILL FOR THE CONCENTRATION OF SULPHURIC ACID.

parent from facts stated in the two preceding paragraphs.

It is manifest that our mineral domain is being gradually narrowed by means not contemplated when the laws were framed.

A DISPATCH from Panama states that about 250 gold and silver mines have been registered lately in the department of Antigua.

LOUIS CHAIZE, a well-known pioneer foundryman, died at San Jose on Monday. He was proprietor of the San Jose Brass Foundry.

credited to the iron-still plants, yet it is nevertheless true that iron stills which cost less than \$100 each are placed alongside platinum-heat pans; are doing the final concentration of areas of greater density than 65° B. without appreciable attack from arsenates, nitrates, etc.; are being driven at any required pace without material deterioration; are handled as easily as platinum in every way; are working at less cost in proportion, and have been thus working for several years. The greatest objection so far brought against the use of iron for this purpose

has been the exceedingly short life of the metal in service.

New as the ideas are, the drawings herewith will have due weight among practical men as details of setting, removal in case of breakage, etc., will be understood easily, the elaboration of the details being more for the study of those who have had an experience with glass alone. Fig. 1 shows a modified and perfected form of iron still, two of which type are connected direct to pans; and taking such pan acid at 63° B. are turning out 12,000 pounds of 98 per cent oil of vitriol each day.

Fig. 2 is entirely different and shows a perfected form of iron still, a modification of which is running at New York and connected to platinum, is turning out nearly 30,000 pounds of 98 per cent oil of vitriol daily.

Annual Assessment Work.

Miners and prospectors who have not already done so, should at once commence the assessment work on their claims to comply with the U. S. mining laws. Only a few weeks more remain in which to do the work. It is foolish to put off this necessary duty until the last minute and perhaps jeopardize important interests.

If work on the claims is not commenced on or before Jan. 1, 1889, they are liable to forfeiture and relocation. The weather about that time may be such in the mountainous regions as to entail a great deal of extra trouble and expense. It is a bad plan to delay such work until the last moment. The working of the annual expenditure feature of our mining laws is now so well known as to require no further explanation. If the work is not done each year, the claim is subject to relocation. When owners let location rights lapse and then take the chances in relocating themselves, they are apt to find some one else on the ground if it is at all promising.

The mining laws are liberal enough and should be strictly complied with. The idea of men holding ground from year to year without working it is a bad one, and the laws are intended to prevent this. They prevent, also, one man holding a dozen or so claims unless he does some work on them all. The amount of work is plainly specified, and there is no excuse for neglecting it. Men with any enterprise or forethought will do it now and not put it off until the last moment.

AN explosion in the Kettle Creek mine, Penn., on Sunday, killed 17 miners, mainly Hungarians and Italians. The direct cause of the explosion was the inexperienced use of dynamite.

The hoisting works of the Stormy King mine at Silver Reef, Utah, were burned one night last week.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Mineral Lands in California.

Suggestions From the Register of the Land Office.

United States Land Office,
Sacramento, Cal., Oct. 20, 1888.

EDITORS PRESS:—I notice in one of the country papers what purports to be a copy of No. 2 of a series of articles published in your journal, bearing upon the difficulties which attend the obtaining of title to mineral lands. I very seldom see the PRESS, and I have not seen the number containing this article, but the copy is in logical sequence and therefore presumably a correct one.

It may be of service to the bona-fide miner if I call attention to one or two of the points touched upon in your article; and first, as to the burden of proof in contests between agricultural and mineral claimants: The rule is, that the return of the United States Surveyor-General establishes prima facie the character of the land and the onus rests upon the party attacking that return. I have noticed that as a whole the returns of the Surveyor-General may be considered as favorable to the miner, that is, that where doubt exists he has returned the land as mineral. It is true that a homestead claimant can file upon a quarter section returned as mineral and thereby establish a reservation of the land which miners must successfully attack before they can file application for patent. I have always thought that it would be in furtherance of justice to hold the private agricultural applicant to the same rule as obtains in the case of the State under its School Land Grant, and to the C. P. R. Co. under the Act of July 1, 1862. This rule requires alike the State and the R. R. Co. to institute proceedings in the local office, to give full notice and disprove the mineral return of the Surveyor-General before their application will be considered. The rule, however, has not been extended to private agricultural applicants. The remedy for the wrong, if it be a wrong, rests, in my opinion, with Congress, and after consideration your journal in the interest of mining may consider it advisable to agitate the matter.

Apart, however, from the question of the onus based upon the Surveyor-General's returns, it is a well-established rule that the local Land Office in addition to its duties as a court deciding between adverse claimants, must act as the conservator of the interests of the United States, and in that capacity seek to prevent fraudulent agricultural entries upon lands properly to be considered as mineral. Within the last two years, during my incumbency, cases have arisen where the local office has taken this course.

In your reason No. 3 you have fallen into an error in stating that only a "dividend-paying claim" is of mineral value. You state that you understand that such has been the ruling of the Sacramento office. I am not aware of any such ruling, either of this office or of the General Land Office. The case to which you probably refer is that of the C. P. R. Co. vs. Valentine, wherein the Register and Receiver failed to agree, and their dissenting opinions were published in the *Examiner* some weeks since. In that case the opinion of the Register in favor of the agricultural applicant, as far as this point is concerned, was based upon his finding of fact that prospecting work had been extensively prosecuted, had proved unsuccessful, and had been abandoned. Without prejudging a case that may hereafter arise, it may be proper to state that I know of no rule or precedent which should prevent a local office from holding land to be mineral in character when the evidence shows that prospecting is being properly conducted in good faith and with a fair showing of ultimately successfully developing valuable mineral property. It stands to reason that unless the probability of future dividend be established the land must be classed as agricultural. The miners certainly will not continue to conduct operations in the view of a certain annual loss, and each land, if possessing a positive agricultural value, should not, upon an ill-founded hope, be withdrawn from settlement.

In the matter of the expense of contests, I desire to call your attention to the fact that, unlike the civil courts, there are no fees in this office. The expense incident to contests is simply the payment of the stenographer for taking testimony and reducing the same to writing. This is fixed by rule at 22½ cents per folio, and each party pays for the direct testimony of his own witness and the cross-examination of the witness of his opponent.

You allude incidentally to the "annoyance and loss of time from the precautions exercised by the local land offices and afterward at Washington." There is hardly a week in which I am not advised by the General Land Office of certain defects in preliminary or final proof in mineral applications which the applicant is called upon to remedy. These are all old cases, and I have felt that I was acting in the interest of the miner as well as performing my official duty in scrutinizing the evidence submitted with the same care that obtains in Washington. It is certainly better for the applicant that he should be subjected to present annoyance rather than that about three years hence he should be notified of the necessity of supplying various clerical or inadvertent omissions in his

proof and thereby cause a delay of two or three years more in the issuance of his patent.

In this whole matter of self-protection to the miner, permit me to suggest to you, as I have frequently suggested to individuals, that the miner's interests will be best protected by taking advantage of the generous provisions of the Act of May 10, 1872, and filing in the local office, as soon as he has performed his \$500 in labor, an application for patent. Such application is entered upon our tract-book, and, in itself, constitutes a reservation, prohibiting an agricultural claim, and maintaining the miner in his possession as long as he performs the annual labor required by law. My observation teaches me that too many of our miners neglect this important matter.

You also allude to the fraud practiced by agricultural claimants in obtaining title to mineral lands and thereafter disposing of them as mineral. I regret to say that I have reason to believe that such frauds have been practiced. It is, however, among the duties of the local Land Office to prevent such fraud if possible, and whenever the Register and Receiver have substantial reason to believe such fraud to exist, final proof will not be accepted. If such fraud even after final receipt be shown to exist, and patent has not already issued, the local office will recommend the Commissioner to order a hearing with a view to the cancellation of the entry. I have made several such recommendations, and have never known a case where the Commissioner has failed to comply therewith. If the miner has slept upon his rights, and if patent has issued, the Land Office has lost jurisdiction, and the remedy then rests with the United States Circuit Courts in an action brought by the relator with the approval of the United States Attorney-General.

Very respectfully yours,
SELDEN HETZEL, Register.

First Discovery of the Comstock.

The following letter to the *Illustrated Pacific States* will be of interest to the readers of the PRESS:

Being a subscriber to your journal, I would respectfully ask space in the same to correct an error that appears in your issue of September 1st, relating to the discovery of the Comstock lode at Virginia City, Nev.

Notwithstanding the account given by your correspondent is based on the Surveyor-General's report, it is not true that James Finney was the original discoverer and locator of the first claim on the lode. The first actual discovery of available quartz was made by Finney and myself, I furnishing the means to do the prospecting. The location was made on the 6th day of January, 1858. James Finney afterward claimed to have located the quartz claim, mentioned in the Surveyor-General's report nearly a year before, but, as was afterward proven, of no commercial value.

The claim in which I was interested was known as the Discovery claim. Having to leave about this time for Placerville to obtain supplies, and there being no means of placing the claim on record before my departure, advantage was taken of my absence and the property recorded in Finney's name. Finding on my return the heartless fraud that had been perpetrated upon me, I several times sought redress from the courts, but having little or no means at command, I found myself helpless before the moneyed combination that had been formed against me.

Some years ago State Senator Wellington Stewart introduced a bill in the State Legislature to compensate me for my losses sustained in the discovery, but the same combination that conspired to rob me in the first place had the influence with members to defeat the measure.

Reno, Nev.

ALVA GOULD.

WHAT IS QUICKSAND?—Quicksand differs from ordinary sand in being largely made up of very small particles of mica largely mixed with water. The mica is so smooth that the fragments slip upon each other with the greatest facility, so that any heavy body which displaces them will sink and continue to sink until a solid bottom is reached. When particles of sand are ragged and angular, any weight pressing on them will crowd them together until they are compacted into a solid mass. A sand composed of mica or soapstone, when sufficiently mixed with water, seems incapable of such consolidation. It is often a very difficult matter to build a road or any artificial construction on quicksand. To remedy this trouble, a Western railroad is putting steel ribs and plates into the excavation for a distance of 140 feet, the former 15 inches wide and the latter 24 inches, in order to secure a permanent foundation for the roadbed.

A HIGH BRIDGE.—The Keystone bridge to be erected at St. Paul, Minn., it is said, will be one of the highest in the world. It will extend from the end of the bridge spanning the Mississippi river at St. Paul, across a flat to the top of a high bluff. There will be about 20 spans, four of which will be 250 feet each in length, the remainder from 170 to 90 feet. The ends of the spans will be supported on trestle hents, some of them being 150 feet in height. The bridge is to be of iron and steel, and the work will be especially heavy, as some of the pieces weigh many tons.

Cholera Vaccination.

[Translated for the PRESS from the *Indépendance Belge* by M. N. M.]

The following on the subject of vaccination against Asiatic cholera was communicated by M. Pasteur to the Academy of Sciences of Paris. In the note epitomizing his experiments and conclusions, M. Gamaleia of Odessa, says: "This work is a simple and faithful application of an experimental method created in the laboratory of M. Pasteur, and which has already given such good results in chicken cholera, rouget, anthrax and hydrophobia. I need only mention the fact that the death of Thullier, five years ago, prevented the application of this method to Asiatic cholera. That event forced M. Pasteur to leave this disease to the investigations of his future scholars. Now, as I have said, I have only applied to cholera the two great principles of progressive virulence and chemical vaccine matter. It is known that the ordinary cultivations of choleric vibrios have such an extremely small virulence that M. Koch, who discovered them, believed, after a number of failures, that Asiatic cholera could not be communicated to animals by inoculation. The scholars of M. Pasteur, in the French expedition to Egypt, succeeded but in a single case in conveying the cholera, and to hut one chicken.

"It is easy enough, however, to induce the choleric vibriion with a virulence extreme; to do so, it is only necessary to put it into a pigeon after a passage through the cobrae (pigeon of passage); it then kills the pigeon by imparting a dry cholera, with exfoliation of the epithelium of the intestine. What is yet more important, the microbe appears also in the blood of the pigeon which have succumbed. After some passages this microbe acquires such a virulence that the blood of the pigeons of passage, in a dose of one or two drops, kills all the fresh pigeons in from 8 to 12 hours. This virus kills likewise the cobraes with doses still smaller. It is important to note that all the animals of these two species—without exception—succumb to the virulent infection. With this absolutely mortal virus we have been able to establish the existence of *immunité cholérique*. Thus, we have inoculated a pigeon twice with an ordinary cholera culture (non-virulent); the first time in the pectoral muscles; the second in the abdominal cavity. This pigeon became refractory to reiterated infection by the most virulent virus (the blood of the pigeon of passage). The fact of immunity has in this way been determined. Now, if we cultivate this virus of passage in a nutritive bouillon and afterward heat this culture to 120° for 20 minutes, in order to surely kill all the microbes that it contains, we then ascertain that the heating has left a very active substance subsisting in the sterilized culture. This culture, in fact, contains a toxic substance, which determines some characteristic phenomena among the animals experimented with.

Inoculated with a dose of four cubic centimeters to a cobrae, the sterilized bouillon produces a progressive lessening of the temperature and death in 20 or 24 hours. At the autopsy we find a pronounced *hyperhémie* of the stomach and intestines, and, as in reason, a complete absence of cholera microbes. The pigeons succumb also with the same morbid phenomena. They are, however, more resistant to this poison, as a dose of 12 cubic centimeters injected at one time is necessary to cause death. If, on the contrary, we introduce that same quantity of 12 cubic centimeters, but at different times, say in three, four, or five days, by injecting, for example, eight cubic centimeters the first day and four cubic centimeters the third day, we do not kill them.

Upon these pigeons, moreover, we verify a phenomenon of the greatest importance; they have become *refractaires au cholera*. The most virulent virus (the blood of a pigeon of passage) inoculated in a quantity of even one-half of a cubic centimeter cannot kill them. The vaccination of the cobraes succeeds even more easily; by putting in them the poison and vaccinal bouillon in doses of two cubic centimeters we vaccinate them in two or three sances, say in all, four or six cubic centimeters. Therefore, we are in possession of a method of vaccination which is preventive of cholera.

This method is founded upon the employment of sterile vaccine-matter, and possesses all the advantages of chemical vaccination; *la sûreté et la sécurité*, since chemical vaccine-matter can be measured in a manner perfectly strict, and introduced in doses small enough to be entirely inoffensive, while the venom of these gives the desired quantity necessary for complete immunity. In this way, then, in our experiments, immunity is conferred *sans danger et sans exception*. We hope, consequently, that this method will be applied to the vaccination of human beings to preserve them from Asiatic cholera.

In a private letter, added to the preceding note, M. Gamaleia wrote the following to M. Pasteur: "I authorize you to make known that I am ready to repeat all my experiments in your laboratory at Paris, in presence of a commission of the Academy of Sciences. I also offer to find out upon myself the inoffensive and sufficient dose for the vaccination of human beings, and, moreover, to make a trip into the countries ravaged by the cholera, in order to prove the efficacy of the method. If you should judge other details necessary, I will report them to you in a complementary note to this,

in which I will give you information of the immunity, of the mode of infection, etc."

The note and letter having been read, M. Pasteur said: "I have the honor to state, Mr. President of the Academy, that I desire to send the note of M. Gamaleia to the committee of the Brest prizes upon cholera.

"As to that which concerns me, it is unnecessary to say that I cheerfully accept the proposition that the experiments of M. Gamaleia be made in my laboratory, according to his expressed desire. M. Gamaleia has already labored several times among us, particularly in 1886, when he was sent to Paris by the municipality of Odessa, at the request of the learned Society of Russian Physicians of that city, in order to study the practice of preventive inoculation of hydrophobia, a method which he to-day informs us has been extended and applied so remarkably to vaccination which prevents Asiatic cholera. But, as he says with all the modesty of a great inventor, he has united to the methods of my laboratory the inspiration of the pages published by me upon chemical vaccination for hydrophobia, in the first number of the *Annales* of M. Daclaux, and the beautiful and decisive experiments of M. Roux upon chemical vaccine matter for *septicémie*, in the number of December last of said *Annales*. Since the labors that I recall, discoveries increase and accumulate in that which concerns chemical vaccine matter. We should not doubt that we will soon possess many others; the knowledge of that of hydrophobia, for example, will soon be known and utilized. Here is one of the last experiments I have made with the assistance of M. Eugene Viala, one of our young helpers in the laboratory, who has acquired extraordinary skill in the art of trephining.

"On the 16th of November, 1887, 15 centimeters of the marrow of a rabbit of 171 passage, which died rabid, was diluted in 30 cubic centimeters of sterile bouillon, after we had kept the cylinder of marrow for 48 hours at a temperature of 35°. Two dogs trephined and inoculated with this diluted marrow have not taken hydrophobia, which constitutes the greatest probability, if not certainty, that the marrow, by the heating, in contact with pure and dry air, had lost all its virulence. Nevertheless, the two dogs treated had been rendered refractory to hydrophobia, since, being inoculated by trephining on the 23d of May, 1888, with the *bulbaire* marrow of a dog that died of furious hydrophobia, these two dogs have resisted, and are still in good health. The heated marrow rendered non-virulent was then vaccinable, by chemical vaccine matter. L. PASTEUR."

Sutro's New Water-Power.

The following paper was read at a recent meeting of the California Academy of Sciences by Theodore H. Hittell:

Recent visitors to the Cliff House, in casting their eyes down to Adolph Sutro's unfinished marine aquarium, may have observed a very large stream of water running out of it. This stream has a fall of several feet and is powerful enough to run a mill. But though thus observed, it may not have occurred to the observers to inquire where that water comes from or to ask themselves why the level of the salt water in the aquarium is several feet higher than the high-water mark in the adjoining ocean. The answers to these questions are, however, exceedingly interesting and exhibit a new and most ingenious adaptation or application of water-power well worthy the attention not only of scientists, but of practical men.

The explanation of where the aquarium water comes from, and why its level is higher than that of high tide in the ocean, is very simple. Those who have carefully observed the aquarium have noticed that it is on the lee side, so to speak, of a jutting rock, and that through this rock, and leading out to its exposed face, is a short tunnel, through which the water flows into the aquarium. At the outer end of this tunnel, and on the face of the rock most exposed to the rollers of the ocean, is an excavated hollow place or basin, the bottom of which is several feet above high-water mark. As the rollers come in they dash violently against the face of the rock, rise in mingled water and foam to a very considerable height, and splash over into the basin. The water thus caught in the basin does not fall back into the ocean, but runs through the tunnel into the aquarium and maintains its high level. Between that level and the level of the ocean, in the cave, where there is no rock to dash against and no splashing, there is a fall, as indicated by the running stream above mentioned, of several feet, enough to furnish very valuable water-power.

It is obvious in a glance that the principle of gaining a head of water thus applied may be made of great importance not only to Point Lohos, but at many other points along the coast. Though the main body of water to be caught is only during high tide, there is hardly any limit to the amount that may be thus secured, provided the basin is large enough and not too elevated. The stream running from Mr. Sutro's aquarium is large enough, as has been stated, to run a mill; and it is evident that it can be relied on with certainty as long as the ocean maintains its level and its rollers come in as they have been coming in for uncounted ages. With the stream thus secured, and capable of increase by simply enlarging the basin, it is plain that great practical ends may be easily and cheaply achieved.

A New View of Mt. Shasta.

We give herewith a new view of Mt. Shasta from a recent photograph by Taher, which presents the mountain and its environment in a somewhat different aspect from previous engravings. The view gives also a hint of the recent advance in industrial development, for in the middle ground is the rapidly growing town of Sissons, occupying ground very near the site of the hospitable hostelry, which has been known for years as the outpost whence the tourist turned his back on civilization and sought the solitude of the trail to the summit. Now the scream of the locomotive and the hammer of the home-builder wake echoes where but recently the voices of the forests were only accompanied by the sharp crack of the hunter's rifle. There has been wonderful growth during the last few years through all the country

conclusions are very erroneous. The towering Alps do not lead to a misconception of sunny Italy, nor should Shasta reflect a chill, even in thought, upon the genial regions which owe their winterless climate in part to the protection afforded by his massive form and by the ranges which inarch their ridges on either side to support his pedestal. A recent writer has commented upon the majesty and beneficence of Mt. Shasta as follows:

Of all American mountains it has the most sovereign look. It leans on no other height; it associates with no other mountain; it builds its own pedestal in the valley and never droops its icy crown. It is a glory in itself. It seizes the clouds with icy arms and compresses them until their contents are dropped upon the thirty fields below; from its base the Sacramento starts on its way to the ocean; despite its frowns, it is a merciful agent to mankind, and in the minds of those who see it in all its power and splendor, a picture is painted which will

A Dry Washer.

The dry-washing gold machine in use in the Osceola (Nevada) placer mine is said to be panning out in a way that is astonishing the miners. The machine separates and collects the free gold irrespective of fineness or shape from gravel, sand, loam and other debris.

This is the machine manufactured by James B. Freeman, the inventor and patentee. It is called "Freeman's Success Dry-Process Gold Separator," and from all accounts appears to do its work perfectly, by collecting, separating and saving fine gold from gravel, loam and other debris, known as placer ground, by a dry process. Very little power is required to operate the largest-sized machine made, a boy 14 or 16 years of age easily furnishing the power for a machine of 50 tons' capacity per ten hours. Other than hand-power may be used if required.

from the placers of Idaho since their first discovery.

When once these machines have been introduced into the many districts in California where dry auriferous gravel beds are known to exist, it is confidently predicted that a mining excitement almost equaling the good old "days of '49" will take place. One noteworthy feature of "Freeman's Success" is the ease and facility with which it may be transported from place to place, it being very light and easily taken apart so as to be packed on "burros" or other animals, or carried by men. The 50-ton machine weighs only 120 pounds, and can be divided into halves to facilitate packing. Two men can operate this size to good advantage, although it requires five or six men to supply it with dirt to operate it to its full capacity.

Three sizes are manufactured—a 50-ton, 100-ton, and a small prospecting machine weighing only 27 pounds, and capable of working about



VIEW OF MOUNT SHASTA WITH THE TOWN OF SISSONS IN THE MIDDLE GROUND.

whence Mt. Shasta's lofty crest can be described. Both in Northern California and in Southern Oregon progress is the order of the day. Homes are being multiplied, natural resources which have long waited the touch of enterprise are being developed, and the future is full of promise.

Mt. Shasta has been appropriately termed the keystone of the arch formed by the great incurving mountain chains of California, the Coast Range and Sierra Nevada. Though the great floor of the Sacramento valley terminates about on the southern boundary of Shasta county, in a foothill region, half-circular in shape, there is beyond this the upper valley and its many arms with their inclosing hills and mountains, forming a country rich and picturesque, which extends northward many miles before the higher mountains close in and place the crown of eternal snow aloft on Shasta's brow, 14,440 feet above the level of the sea.

It has been frequently remarked of late that the great snow-covered mountain, through the dissemination of engravings of it reproduced from the masterpieces of the artists, has really given distant people the impression that Northern California was an arctic region and Central California must therefore be semi-arctic. Such

last as long as the gift to admire anything magnificent is left.

The engraving shows in the clearing at Sissons the way the march of progress is changing the face of the country. Rapid deforesting of the area may be expected, as we understand that about ten sawmills are now running to their full capacity in the Shasta region.

Our picture is one of a series of photo-facsimiles prepared by the Dewey Engraving Co. for a handsome publication by J. C. Steele of the Denver & Rio Grande Railway, illustrating California scenery. This is another enterprise which will tend to make California better known.

KEELY MOTOR.—W. B. Le Van, the expert appointed by the court to examine the Keely motor to determine whether or not it is a fraud, has reported to the court that the generator shown him by Keely was a stationary structure, dependent upon the manipulation of an operator, and could by no possibility be made self-operating.

COAL FIND NEAR ASTORIA.—There is considerable excitement at Astoria over the reported finding of coal near that city in paying quantities, and about 50 persons have filed claims aggregating 8000 acres.

The action obtained in this separator is produced wholly by the expansion of air and not by velocity, and there is no blast to drive the gold from the riffles. The finest particles of gold, irrespective of shape, are saved, and when once the debris has passed through the machine it is not possible to find a particle of gold in the tailings. The drier the material to be "washed" the better, although the separator works well in quite damp ground. These facts are learned from persons who have thoroughly tested the "Freeman's Success." Without any exception they declare that perfection has at last been attained in gold dry-washing.

Every old Californian, like the writer of this item, knows that there are many thousands of acres of rich placer ground in the Golden State upon which it is impossible to get water, but which by the use of this invention may be made to give up the golden treasure. The same is true of Idaho, Montana and Nevada. The golden sands of Snake river, which are found in the banks and bars for hundreds of miles along that great stream, may be worked to good advantage, as the finest of flour gold remains in the machine after the sand has passed through. Its introduction upon Snake river alone will result in adding more millions to the world's supply of noble metal than have ever been taken

two tons per day. The cost of the 50-ton machine is \$125; 100 ton, \$200; prospecting, \$25. Machines of greater capacity are furnished to order. Mr. Freeman has also invented a pulverizer, which will pulverize the smallest particles of clay or cement, and thoroughly clean from the stone all particles attached thereto, thereby liberating the gold and preparing the debris for thorough separation.

The inventor spent many years in efforts to produce a light machine of great capacity that would save gold, and having succeeded, his fortune is assured. His invention affords the hundreds of men who have spent fortunes in the vain attempt to save the fine Snake-river gold, an opportunity not only to "get even," but rich. The future operations of this wonderful gold-saver will be watched with great interest by the miners and all dwellers in the Pacific States and Territories.—*Utah Union*.

A TALL SMOKESTACK.—What is probably the tallest smoke chimney in the world is now being completed at East Newark, N. J. The base diameter is 28 feet. It is solid brick to an altitude of 310 feet. At its top it is nine feet in diameter. A cast-iron rim 20 feet in diameter, and a bell, surmount the whole, and make the total height of the structure 335 feet.



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SAN FRANCISCO

Saturday Morning, Nov. 10, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Mineral and Agricultural Lands; Iron Still for Sulphuric Acid, 309. Passing Events; Mine Ventilator; A Prospecting Dredge; Annual Assessment Work; Leaching Department of the Marsac Mill, 312. The Solar Eclipse of January 1st, 313.

ILLUSTRATIONS.—Fig. 1.—Improved Iron Still; Fig. 2.—Improved Iron Still for the Concentration of Sulphuric Acid, 309. View of Mt. Shasta with the Town of Sisson in the Middle Ground, 311. Map Showing Path of Eclipse in California and Nevada, 313.

CORRESPONDENCE.—Mineral Lands in California; First Discovery of the Comstock, 310. MISCELLANEOUS.—Cholera Vaccination; Sutor's New Water Power, 310. A New View of Mt. Shasta; A Dry Washer, 311.

MECHANICAL PROGRESS.—A New Machine for Making Horseshoe Nails; They Admit that American Machinery Beats Them; Profit on Car Wheels; A Mechanical Filter for Putrid Water on a Large Scale; Cutting Steel Hot or Cold; A Three-Thousand-Ton Shear; A New Wrink in Wheel Tires; Effectiveness of Machinery; Ramie Machines, 315.

SCIENTIFIC PROGRESS.—Human in Connection with Machine Anatomy; Changes in the Marking of Mars; Hostility to New Things; The Increasing Rainfall; A Novel Pyrotechnic Display; A Curious Phenomenon; Fireproof Wood; A Great Find of Early Paintings; Curious Formation of Crystals; Fluoride of Nitrogen; A New Island, 317.

USEFUL INFORMATION.—Substitute for Glass; The Many Uses of Castor Oil; How Oil Tanks Should be Emptied; Glass Cloth; Another Explosion from Dust; To Take Impressions from Seals or Coins; The Lebel Rifle and Powder, 315.

GOOD HEALTH.—Cold Water Before Breakfast; Treatment for Rheumatism; Making the Blind See; Fresh Air for the Baby; Natural Recovery from Hydrophobia; Death from Seeds; Aching Fingers; How I Prevent My Hair from Falling Out, 315.

ENGINEERING NOTES.—The Largest Flume in the World; A Novel Process for Dredging Water Channels, 315.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 316-17. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullock Shipments, 320.

Business Announcements.

[NEW THIS ISSUE.]

Drills—Rand Drill Company, New York.
Surveyor and Draughtsman—G. Friederich, Oakland.
Ore Crusher—Wm. Guttenberger, Sacramento.

See Advertising Columns.

Passing Events.

The time of the public has been pretty well occupied this week with election affairs. In National affairs the Republican party has been successful in electing its ticket. Now that all the excitement is about over we can once more settle down to every-day business.

The reduction works at National City, San Diego county, have commenced operations, starting with some ore from San Bernardino county. About 100 men are employed. It is intended to put up smelting furnaces shortly.

The sale of the Vulture mine for the large sum of \$900,000 is a good thing for Arizona. That Territory badly needs capital to develop its mines, but has had very little of late years.

Mention is made in another column of a decision relative to running mining tunnels into adjoining agricultural land. This is a very important matter to miners, in view of the way the mineral land in this State is being taken up by agricultural claimants.

We give in this number of the PRESS a map showing the path of the coming total eclipse of the sun. This will be found convenient for reference by all our readers.

Mine Ventilator.

A recent report of the Mines Ventilation Board of the colony of Victoria on the subject of the ventilation of gold quartz mines at Sandhurst has many points of interest. The mine-owners there, not expecting that the claims would pay at any great depth, did not provide for carrying air down their shafts. The works have, however, been put down, until now there are numerous shafts from 1500 to 2000 feet deep, and the result is there has been difficulty in ventilating. The report goes into the subject very fully and gives the testimony and experience of all the mine superintendents. The information derived will be of interest to California miners. After a careful review of the evidence and the notes taken during personal observation in a number of mines, and having inspected all the mechanical appliances in use for ventilating that were brought under notice, the opinions and the recommendations may be summarized as follows:

That the best system of natural ventilation is that of carrying down winzes simultaneously with the shafts, but even with such a system there may be portions of the workings (such as long ore shoots, etc.) where natural ventilation should be resorted to.

That in cases where the sinking of winzes has been neglected, and a large expenditure of time and money would now be necessary to make a proper upcast and downcast, some mechanical appliance, such as a blower or fan, should be immediately adopted where required to supply the miners with pure and cool air.

That Root's blower has been found to be a good machine for forcing air down mines.

That where circumstances are favorable, holding through from one mine to another secures good ventilation to the depth at which the connection is made.

That for the future more attention should be paid to having the shafts of a sufficient size to allow of pipes being put down for mechanical ventilation.

That all new shafts should in future be close timbered.

That the bark should be taken off all timber before being sent down for use in mines.

That proper sanitary regulations should be enforced in every mine and disinfectants supplied.

That where practicable a water spray should be provided for laying the dust in mines when necessary.

That every mine manager should have a thermometer fixed in some convenient place in the principal workings.

Ordinary atmospheric air consists of about 79 measures of nitrogen and 21 of oxygen with 1-2500 part of a measure of carbonic acid. The rate of increase in temperature is, as a rule, 1° for every 64 feet, but the rate is not constant, there being many circumstances connected with different mines calculated to disturb the uniformity.

An adult breathes from 14 to 16 times in a minute, inhaling from 30 to 40 cubic inches of air at each inspiration, and expelling a like quantity. Inspired air loses nearly five per cent of its oxygen and gains a corresponding amount of carbonic acid gas. Air containing more than six parts in 10,000 of this gas is unwholesome; 20 parts in 10,000 will cause permanent injury to persons of delicate organization, while air containing 10 parts in 100 is fatal. A simple test for detecting the presence of this gas in unwholesome quantities is the following: Take a 10-ounce bottle of air and place therein one half ounce of clear lime-water. Cork and shake up. If no precipitation of carbonate of lime take place, the air is good.

At the Broken Hill mines, N. S. W., boys are paid four shillings a day for sorting rock on top; miners receive 10 shillings, and engineers and carpenters 11 shillings per day. There is no Saturday afternoon or Sunday work. Most of the miners live in tents and board themselves, as board and lodging in the few hotels costs \$30 to \$35 a month. Water is brought into the town in carts from a distance of 30 miles, and costs about \$1.50 per 100 gallons.

The machinery for the 50-ton sampling works at National City, San Diego county, is on the ground.

They are talking of building a "salt palace" at Salt Lake City, Utah.

A Prospecting Dredge.

A device for prospecting the bottoms of rivers and streams for gold has just been patented through the MINING AND SCIENTIFIC PRESS Patent Agency by John Hatch of this city. The device has two hollow scoop-shaped buckets, having the upper inner angles hinged to lugs which project from a horizontal shaft. The lower edges of these buckets oppose each other, so that when closed by force they will gather up any material which may lie between them, and when opened the lower edges are separated sufficiently to allow the material to be deposited where desired.

A shank or shaft is secured to the horizontal shaft so as to extend upwardly from its center, to which it is secured by a set screw or other convenient device. A nut is fitted to travel on threads of the screw, and this nut is secured by set screws in the hollow tubular shank. A groove or channel is turned in this shank, just above the nut, and around this groove is loosely fitted a sleeve having lugs upon opposite sides, and in these lugs the upper ends of the connecting rods are hinged. The lower ends of these rods are hinged to the upper outer sides of the buckets.

Within the hollow shank may be fixed a long stout pole or handle, which enables the operator to drop the buckets down upon the bed of the stream at any suitable depth. By turning the handle round, the nut will be turned and caused to travel up the screw threads, so that the connecting rods traveling with it will draw the outer edges of the bucket upward and toward each other, thus separating the lower and cutting edges so that they stand widely apart. In this position the device is lowered upon the bottom which it is desired to prospect; and by turning the pole in the opposite direction the buckets are closed and may be drawn up with the gravel or other material, which may then be examined. A slightly different construction is made when the power needed is not so great as that of the screw.

Growth of the Postal Service.

It is estimated at the Postoffice Department that the deficiency in the revenues of the postal service of the fiscal year just ended will be about \$4,000,000. Last year the deficiency was something over \$500,000. Owing to the cheap rates of postage, especially for newspapers, the bulk of mail matter has increased at such a rate that the cost of the service has grown immensely. The force of employees, especially in the large offices, is taxed to handle the vast quantity of matter that is daily poured in.

In some instances the newspapers are not sent to the offices at all, but are weighed and stamped at the office of publication by some one authorized to do the work, and the bags are sent directly to the railroad depots. Were this not done, it is stated that some of the large postoffices would be overwhelmed and that it would be impossible to handle the matter with dispatch and accuracy. It is believed by the post office officials that the statistics for the year just closed will show a large increase in the number of letters mailed.

At present England is the greatest letter-writing nation in the world. The annual ratio of increase in this class of mail matter is much greater in this country than in England, and if the present rate continues, in a few years the United States will stand at the head as writing more letters per capita than any other people. The bulk of mail matter, or the number of pieces handled by the United States postal service, is now greater than any in other country, but this is mainly due to the extensive circulation of newspapers.

Bismuth ore of good quality has recently been discovered in Sinaloa, Mexico. It is reported that the "honzan people" have sent an expert to examine this mine. The ore looks very well, but is not, apparently, as rich as that found in Serata, Bolivia. The demand for bismuth is limited, and it would not take many tons to satisfy the market.

A PRIVATE letter from Port Townsend reads: "R. Dunsen & Sons are contemplating opening another mine contiguous to the East Wellington mines. There is some talk also that the Alexandria mines will soon be put in operation."

Leaching Department of the Marsac Mill.

This addition to the Marsac mill, Park City, Utah, is fast approaching completion. All the buildings are finished, and work on the interior is going ahead at a rapid rate. Several of the tanks are ready for use at the present time.

We are told that one receives at once a favorable impression of the leaching process after passing through the panroom of the Marsac and continuing on to the leaching department for the use of the Russell process, and contrasting the two methods of treatment. To operate the panroom, containing 16 5-foot pans and working from 65 to 70 tons per day, there is required a powerful engine making 63 revolutions per minute solely for the purpose of driving the "line shaft," from which is taken the power to run the pans, settlers, agitators, cleanup pan and quicksilver elevator. This work requires 58 pulleys, 27 sets of gearing, 28 jack-shafts, 30 belts, 80 journals, etc. Then there are the foundations and framework to carry this machinery and support the pans, settlers and agitators, each of which is a machine of itself, needing constant attention and frequent renewal of its wearing parts. Besides this, there are several pipe lines and the necessary appliances for conveniently handling heavy castings.

The leaching department of the Marsac will be capable of treating 120 tons per day, or nearly 100 per cent more than the present panroom, at about the same daily expense; consequently ore of much lower grade can be mined and milled. In this department double the work that the pans can do will be done in four large wooden ore-tanks, six precipitation-tanks, three solution-tanks and three iron sulphide tanks. Besides these there is a pipeline, a three-compartment trough alongside the ore-tanks and a filter press and drier.

A comparison between the panroom and leaching department, as regards castings required, is very significant. The total weight of castings in the Marsac panroom is 371,770 pounds, while to do twice the work in the leaching department only 28,520 pounds of castings will be used.

OCCIDENTAL.—This Comstock mine during the past year produced 383½ tons of ore which has been milled, yielding billion of the assay value of \$52,624.75, of which amount \$14,605.55 was in gold and \$38,019.20 was in silver, the average yield being \$13.73 per ton. The expenses for the year were \$91,544, and two assessments were levied, one of \$20,000 and the other of \$25,000. The new officers are as follows: Geo. R. Wells, President; Joseph Marks, Vice-President; H. Zidig, Geo. Frier and E. B. Holmes, Directors. A. K. Durrow is Secretary, and D. B. Lyman, Superintendent.

A PARAGRAPH is going the rounds of the press to the effect that E. E. Barnard of the Lick Observatory has, with the big telescope, discovered a comet. He has discovered a comet, but not by means of the big telescope. A very small glass is used for comet seeking, and Mr. Barnard does not use the 36 inch lens for his special work.

LEAD PENCIL AND INK.—A notice posted on a claim at the head of Mill Creek canyon by Chas. Nye in 1879, written with a common lead pencil, still remains as clear and legible as ever, while another near by, written with ink, and evidently posted some years later, cannot be deciphered.—*Homer Mining Index.*

OVER 1000 feet of iron pipe has been shipped to the Livermore coal mines. The pipe is to be used in conveying water to the mines from one of the many springs that are found in that locality.

BUILDING improvements in San Francisco aggregate in value \$5,593,577 for the first 10 months of this year. For each of the past three years the record is about the same.

A HEAVY list of assessments will become delinquent this month. Nevada mines ask for \$585,800, and California mines, \$33,500, out of the total of \$619,300.

A QUARRY of brownstone of fine quality has been found at Raymond, Fresno county, near the railroad. It is to be developed with vigor.

The Solar Eclipse of January 1st.

The total solar eclipse which will occur on January 1, 1889, will be an event of great astronomical importance. To citizens of California and Nevada it will have special interest, since the path of totality—or complete obscuration—crosses these States over an area favorable for observation. There will not be another total solar eclipse anywhere in this part of the world during the remainder of this century.

We have shown on the excellent coast map of the Pacific Railroad Gazetteer the path of

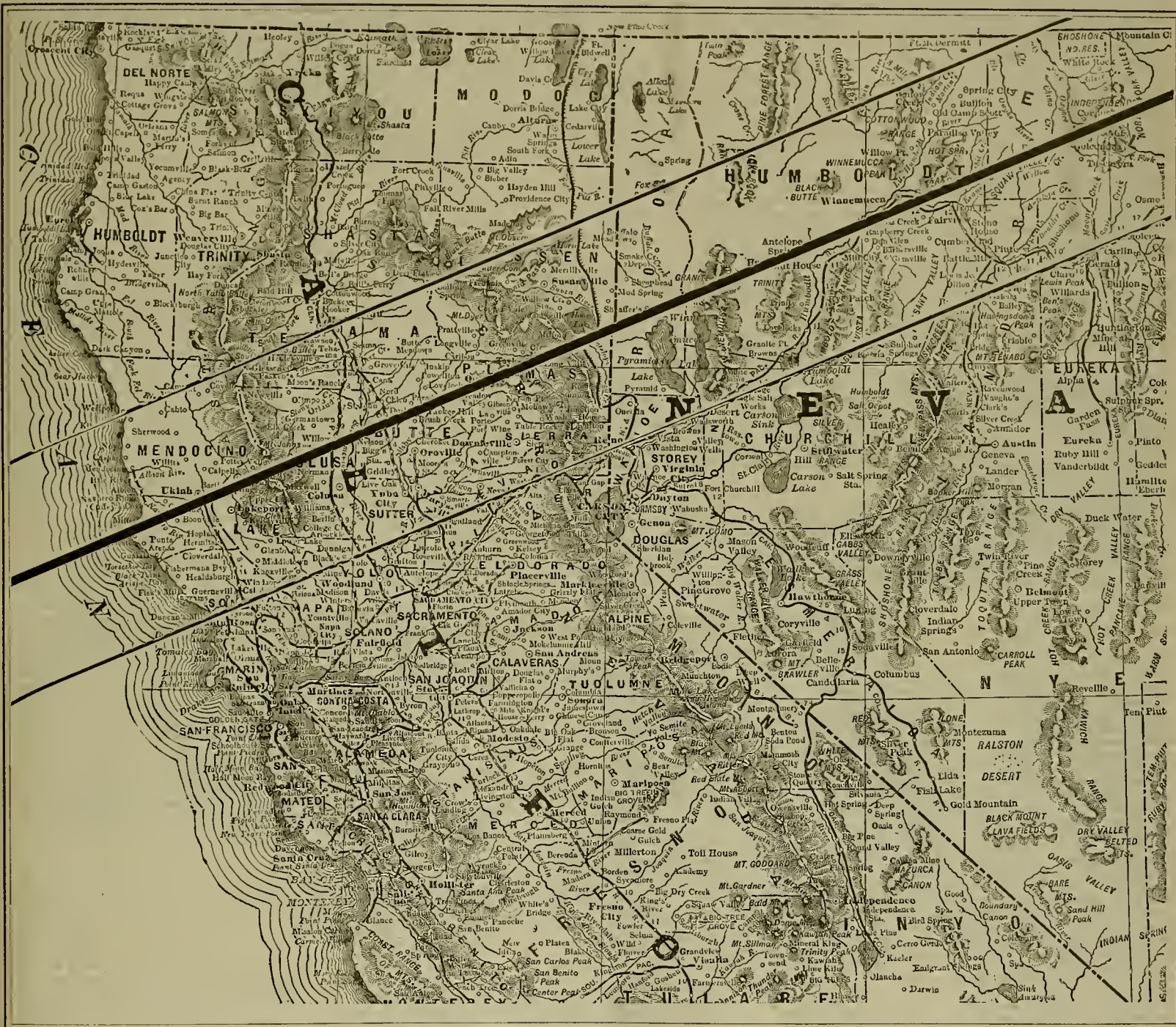
central point of the moon's shadow will cross the Western Nevada line at a point 32 rods north of the 124th mile post. The south edge of the moon's shadow will pass about half-way between Reno and the highest point of Peavine mountain. Thus Reno will be just outside the shadow. The center of the path will be about six miles north of Winnemucca, and 29½ miles north of Tuscarora. The south edge of the path will pass north of Wadsworth and south of Pyramid, Lovelocks and Humboldt House. The north edge of the path will pass north of Buffalo Meadows, Willow Point, Paradise Val-

ern and southern lines the amount of obscuration decreases gradually with the distance both north and south.

It is greatly to be hoped that there will be clear weather, though January is an unfortunate time of the year for astronomical work here, since it falls in the middle of the wet season. The Royal Astronomical Society has published a letter of Prof. E. S. Holden of the Lick Observatory, giving the probable meteorological conditions. He gives the records of cloudiness at various California stations for the last 15 days of December and the first 15 days of

that a number of eclipse expeditions will be formed in the East and come to California, and some observers are expected from Europe. Photographers will accompany all these parties. Members of the Pacific Coast Amateur Photographic Association are making preparations for the event and will occupy different points along the line of totality.

BIG LAND GRAB ATTEMPTED.—A dispatch from Santa Fe states that one Hodges has notified Surveyor-General Julian that he and his brothers and sisters are the rightful owners of



MAP SHOWING PATH OF TOTAL ECLIPSE IN CALIFORNIA AND NEVADA JANUARY 1, 1889.

the eclipse. In all that area embraced between the upper and lower lines which we have drawn on the map the eclipse will be total. The central line shows the path of greatest totality. Above the northern line, and below the southern line, the eclipse will not be total. The best places for observation in this State are Point Arena, Ukiah, Bartlett Springs, Willows, Chico, Quincy, Loyalton, Oneida, Long Valley, Milford, etc. All places on or near the center of the path will be in darkness for about two minutes of the time.

At the central line, near Oroville, the totality will be 114 seconds; at Point Arena it will be 120 seconds. It will last from 108 to 120 seconds—longer nearer the coast than in the interior.

In Nevada the shadow of the moon will cross the western line at the town of Verdi, and its breadth is so great that from Verdi north along the boundary for a distance of about 100 miles there will be total darkness of the eclipse. The

ley, Spring City, Willow Creek, Cornucopia and White Rock, and will pass ten miles south of Fort McDermitt.

This eclipse from beginning to end will be very long. For instance, at Point Arena, the beginning of the eclipse will be 1 hour and 10 minutes before the beginning of totality, and the end will be 1 hour and 16 minutes after the ending of totality, the whole lasting over 2½ hours. It begins at that place at 0h. 15m. 11 secs. mean time. For standard Pacific time, 14m. 58 secs. should be added to that.

In San Francisco the eclipse will not be total, but very nearly so. About eleven-twelfths of the sun will be obscured. Here it will begin at 23 minutes 7 seconds past 12 o'clock, and end at 9 minutes 6 seconds past two o'clock. The time of greatest obscuration is at 43 minutes 43 seconds past 1 o'clock.

Citizens of this State and Nevada can see from our map the cities and towns within the limits of the totality path. Outside the north-

January, but prefers not to express any definite opinion on a subject so uncertain as California weather in January. He simply presents the data.

Time signals from the Lick Observatory are received daily (at Pacific standard noon) at nearly every railway station in California. On the days immediately preceding and following the eclipse they will be automatically transmitted from the standard clock, and special pains will be taken to make them useful to observing parties in the field.

The observing party from the Lick Observatory intend going to Bartlett Springs, with their instruments, which will include a spectro-scope. Mr. Burckhalter (Chahot Observatory) and party will go somewhere between Cloverdale and Ukiah. Mr. Blinn (Blinn Observatory) will go to Winnemucca peaks, Nev. Prof. Davidson (Davidson Observatory) will probably go to some point in Nevada, in the hope of getting good weather. It is expected

a tract of land 30 miles square, containing 600,000 acres, in Colfax county, N. M. The title to this vast territory is claimed under a grant alleged to have been made by the Crown of Spain in 1635 to the present claimants' natural ancestors, who bore the peculiar name of Corpus Christi. The land claimed is located in the vicinity of the towns of Raton, Springer and Folsom, and probably includes the last two named towns. A portion of the Maxwell grant and large numbers of claims of settlers are jeopardized.

BISON TAKEN ALIVE.—It is stated in a dispatch from Cheyenne that some cowboys, while gathering heaves last month on the Sweetwater river, in Fremont county, Wyoming, ran upon a herd of 23 buffaloes. They followed them ten miles and captured six calves by lariat. Two of the calves were choked to death, but the remaining four are in a pasture on Sweetwater river, about 16 miles north of Rawlins.

MECHANICAL PROGRESS.

A New Machine for Making Horse-shoe Nails.

In a locked room in a shop in Pawtucket, R. I., stands a machine, the invention of a Rhode Island gentleman whose reputation as a civil and mechanical engineer is not confined to this country alone. The invention is kept almost as completely apart from the crowd as the Keely motor, but there is the very pronounced difference between them that this motor will "mote." It is a machine for making horseshoe nails, and represents seven years of experiment and study by John A. Coleman, and the expenditure of tens of thousands of dollars. It is fully protected by patents, and, says the Providence Journal, in the opinion of competent judges—men engaged in just this line of manufacture—is destined to work a revolution in that industry.

The object sought to be accomplished is to make a nail which shall be tougher than those in general use, which will not split and which will not crack the hoof; in short, a better nail in every way than any now in use. Mr. Coleman makes his nails by cold drawing from blanks considerably shorter than the finished article. The machine, which takes advantage of simple natural laws, is strictly automatic, the only attention required being that a supply of blanks shall be provided, and these may be delivered to it in a tangle just as they are dumped out of a keg, and that the machine shall be kept oiled. The essential parts are few in number and positive in action; in fact, the whole machine is wonderfully simple when the work it does is considered. The finished nails have as fine a polish as if rattled, and a long, even taper to a point as keen as a needle's. A new nail just from the machine dropped from the height of the walet will stick upright in the floor at one's feet.

It is said that these nails have been thoroughly and satisfactorily tested in competition with standard makes of horseshoe nails. Although the machine is larger than its commercial issue will be, as it represents the evolution due to years of thought and development, it presents an interesting study in the manifest employment of the most direct means to effect a desired result, and is mechanically very satisfying. The machine will occupy but little floor space, and its design combines grace with ample strength. It is attracting much attention from men in the horse nail and allied industries, and just before the writer was ushered in the manager of a company of iron-workers employing 5000 hands took their departure, after spending nearly half a day in inspecting the machine with a view to negotiations.

They Admit That American Machinery Beats Them.

It is a remarkable fact, says the *Iron and Steel Trades Journal*, London, that in the manufacture of different kinds of machinery, the Americans can beat us in price. Wages in the United States are about 50 per cent higher than in this country; materials are from 25 to 50 per cent dearer; yet the finished machines can be put on the market cheaper. It is true that the Americans cannot send out machines to neutral markets any cheaper than is done by our manufacturers; but it is surprising that they can, at least, meet us in price. The chief explanation, as we pointed out in a leader in the last issue of the *Journal*, is in the fact that in the United States the inventive faculty is impelled and sharpened by necessity, and has been applied to the designing of labor-saving tools. The stagnation and lack of trained brain-power among our manufacturing engineers are largely traceable, we think, to the fact that the engineer and engineering have pooch-pooched the idea that the Americans are ahead of us in any respect. While those journals which profess to be the mouth-piece of the engineers have scouted the idea that the engineers of this country are second to the American engineers in any respect, the engineers who have visited the United States have almost unanimously returned with the impression that in setting out manufacturing establishments of the best class in America, the object kept steadily in view is the need of cheap production. Our iron and steel makers supply our engineers with the best and cheapest material the world produces, and there is no room for doubt that our iron and steel producing establishments are in every respect in front of the works in the United States. Our engineers forfeit many of the advantages which the iron and steel masters confer on them in the shape of cheap and good materials by their comparative failure to utilize labor-saving tools.

So long as our iron and steel masters supplied the engineers with materials much cheaper than could be done in other countries, there was not so much necessity for the engineers scheming out devices to cheapen the cost of production; but with the prices of raw materials in other countries gradually approaching the quotations ruling on our markets, the engineers must more and more bestir themselves in the direction of discovering labor-saving machines for use in their workshops.

PROFIT ON CAR-WHEELS.—A careful and itemized statement of the cost of making car-wheels has been prepared and published by E.

Warne of Easton, Pa., based on figures obtained from actual practice in the Taylor Iron Works at High Bridge, N. J. The iron used was three-quarters charcoal pig, at \$26 50 per ton, and one-quarter old wheels, at \$19 per ton, equal to \$24.62 per ton for the stock, four wheels being made from one ton. The cost was \$7.86 for each wheel. These wheels are sold at \$8, thus leaving a profit of only 14 cents per wheel. At that rate of profit there must certainly be a strong inducement to economize in every step in the process of manufacture. Yet this is a class of manufacture, above all others, on which a sufficient profit should be allowed to secure the very best of materials and the very best possible care at every point of production. A parsimony on the part of railroads which should reduce the profit on the wheels of their cars to 14 cents each should receive a most pronounced rebuke from the traveling public and from legislative and administrative bodies everywhere.

A MECHANICAL FILTER FOR PUTRID WATER ON A LARGE SCALE.—A filter of 1,500,000 gallons daily capacity was recently tested at Seneca Falls, N. Y., and brought out very favorable comments from the mechanical engineers and others who witnessed the trial. The plant is the largest manufactured for filtering this quantity of water in one shell. A local paper in describing the test says: The experiments with the Hegeman & Oliphant system of filtration here have attracted wide interest. Here is a hoiler-iron vessel which could be placed in any ordinary room 12 feet in length. Into this vessel is let, through a six-inch pipe, any water available, however tainted. The last test was made before Mueller, the engineer of Spreckels' sugar refinery at Philadelphia. The filter is at Gleason Mills, and on Thursday it took in stals and putrid water at the rate of 700 gallons a minute and delivered it as clear as crystal. Mr. Mueller declares that no greater or more trying test was ever made, because finally the inlet was stuffed with fire-clay, which all chemists consider the most difficult of filtration. B. B. Davis, the superintendent of the Gleason Knitting-Mills, and Frank C. Beebe, the superintendent of the Gleason & Bailey Company, with Irving Lewis, his assistant, declare that the test was perfect, that the filter was run without the use of any chemicals, and that the simplicity of the system was eminently practical.

CUTTING STEEL HOT OR COLD.—A correspondent of the *American Machinist* gives his experience in cutting steel as follows: About cutting hot and cold steel, I would state my experience, which goes to prove that you must run the saw slowly for cold steel, and not at a high speed. For hot steel the saws are usually about 3' 6" to 4' 6" diameter, and run at high speed (800 to 1000 revolutions per minute). The teeth are simply punched out, and when worn, re-punched. For cold steel, both bend and circular saws are used, and the speed is according to what is being cut, and varies from 100 to 300 feet per minute. These circular cold-steel saws are now much used for cutting off the "head" of steel castings, and answer better and are quicker than the older method of cutting off in the lathe or slotting machine.

A THREE-THOUSAND-TON SHEAR.—Carnegie, Phipps & Co. of Monhall, near Pittsburgh, Pa., have recently set up what is undoubtedly the largest shear in the world. It is rated at 3000 tons, and forms a part of their famous slabbing mill. The shear is worked by the descent of the upper blade, which is effected by the introduction into the cylinder of water under a pressure of 4000 pounds to the inch. The cylinder is a heavy steel casting weighing about 25 tons. It is 13 inches thick on the bottom and 17 on the sides. It is 37 inches deep. Its total outside width is 8 feet and 11 inches. The shear has a capacity for cutting a piece of steel 48 inches wide by 24 thick. A careful study of these dimensions will afford some idea of the magnitude and power of this immense tool.

A NEW WRINKLE IN WHEEL TIRES.—In England, especially in cities where street railroads are common, a tire is made for the wheels of road vehicles which, instead of being of uniform width, is made wider at intervals of a few inches, the object being to avoid the breakage of wheels and axles when coming against the side of street car rails. The shoulders between the wide and narrow parts are sufficiently abrupt to make the wheel mount the rail as soon as one of the shoulders comes in contact with it, and the aliding and sideways pulling, which is the cause of so many wrecks of carriages and wagons in cities, is avoided.

EFFECTIVENESS OF MACHINERY.—An English paper says: As an instance of what can be done by using labor-saving machinery, we may state the gradual introduction of new appliances in a foundry and engine shop has resulted in 50 men producing as many castings as was formerly turned out by 200 men.

A NEW STREET CAR MOTOR run with gas made automatically from crude petroleum was recently exhibited in Chicago. The inventor claims that it is capable of a speed of 15 miles per hour at a cost of less than \$1 per day.

RAMIE MACHINES.—France follows India in offering large premiums for the invention of a machine for decorticating ramie fiber, which in gloss and luster approaches the finest silk and promises to become invaluable.

SCIENTIFIC PROGRESS.

HUMAN IN CONNECTION WITH MACHINE ANATOMY.—Machinists often find it necessary to so arrange the construction of their machinery as to properly fit certain parts to be conveniently handled and worked by operators. To this end human models are often kept in drafting-rooms—made to various scales pertaining to the drawings on which they are used. These are usually constructed, says a contemporary, of pasteboard, cut out with a profile representing a vertical "fore-and-aft" section of an average-sized man. The different pieces of pasteboard are jointed together with an ordinary eyelet at the neck, shoulders, elbows, hips, knees, and sometimes middle of back. They need not be very accurate, and take but a few minutes to make. Such a model can be laid upon a drawing of the proper scales and the relative positions ascertained of treadles, tables, hand-levers and various projecting points, thus avoiding interferences and adapting handles, treadles, knee-levers, etc., to the anatomy of the operator, whom the model vicariously represents for the time being. Models of horses and other animals used with machinery can obviously be made in the same way. Other sections than the one mentioned can, if desired, be shown. For instance, a man can be shown in back or front view when used upon similar views of machines to be operated.

CHANGES IN THE MARKINGS OF MARS.—The observations of M. Perroux at Noe, and M. Terby at Louvain, and, in England, of Mr. Denning at Bristol, have confirmed the presence on the planet of most of the "canals," or narrow dark lines, which were discovered by M. Schiaparelli in 1877, and at subsequent oppositions. M. Perroux has also been able to detect, in several cases, the gemination or doubling of the canals, and M. Terby has observed the same phenomenon in one or two cases, but with much greater difficulty than in the opposition of 1881-82. But some curious changes of appearance have been noted. An entire district (Schiaparelli's *Lybia*) has been merged in the adjoining "sea," i. e., its color has changed from the reddish hue of the Martial "continents" to the somber tint of the "seas." The district in question is larger than France. To the north of this district a new canal has become visible, and again another new canal has appeared to traverse the white north polar cap, or, according to M. Terby, to divide the true polar cap from a white spot of similar appearance a little to the south of it. With the exception of these changes, the principal markings, both light and dark, are those which former oppositions have rendered familiar.

HOSTILITY TO NEW THINGS.—A universal law of social progress, with which we are all familiar, is that established systems in thought, morals, manners, government, or any department of human activity, struggle to perpetuate themselves by a fight against all innovations. Whatever is new and progressive, or represents the requirements of an enlarging field of life, has got to gain its foothold in the face of the powerful opposition of the old and pre-established. Those more perfected and exact conceptions of nature, which we call scientific ideas, have prevailed only after centuries of moral strife with the inherited superstitions and imperfect generalizations of our semi-civilized forefathers. The progressive and liberal governments of our most advanced nations to-day have been established in spite of the bitter opposition of their predecessors, and are themselves fighting tooth and nail the higher forms that will succeed them. In literature and art, old schools strive to deny existence to the new; and, even in the little affairs of our daily lives, we are all permitting the things that are, and "have sufficed to our fathers before us," to keep out the better things that might be.—H. G. S. Noble.

THE INCREASING RAINFALL.—The great increase of rainfall throughout the United States during the last 15 or 20 years has been attributed by many to some electrical disturbance in the atmosphere, brought about by the many and constantly increasing lines of rails which are continually being laid down in every direction. But now comes a correspondent of the *Northwestern Railroader*, who advances a different theory for the increasing prevalence of floods and rainstorms. He says that there are over 30,000 locomotives in use in North America, and estimates that from them alone over 53,000,000,000 cubic yards of vapor are sent into the atmosphere every week, to be returned in the form of rain, or over 7,000,000,000 cubic yards a day—"quite enough," he says, "to produce a good rainfall" every 24 hours. Estimating the number of other non-condensing engines in use as eight times the number of locomotives, the total vapor thus projected into the air every week in this country amounts to over 470,000,000,000 cubic yards. "Is this not," he asks, "sufficient for the floods of terror? Is there any reason to wonder why our storms are so damaging?"

A NOVEL PYROTECHNIC DISPLAY.—One of the most novel pyrotechnical displays on record was that which formed a feature of the centennial celebration at Pittsburgh, when the Allegheny river was illuminated by natural gas. A large pipe connecting with a natural gas main was laid under the river, with a jet below

the surface of the water. When the gas was turned on the pressure carried a column of water with it and blew it into spray. After the gas was ignited by sending a rocket into the column, the effect is said to have been very beautiful. The flame was also colored by an arrangement on the river-bank for forcing chemicals into the gas main, which caused red and green fire.

A CURIOUS PHENOMENON.—A curious thing happened in Bowling Green, New York City, during the progress of a thunder-storm which visited that city on the 17th ultimo. According to a New York paper, several persons who were standing under the shelter of the Field building when the first heavy thunder-clap was heard, were surprised to hear another report almost simultaneously. Instantly a flame shot four feet into the air from the opposite corner in Bowling Green, the heavy iron cover to the electrical subway manhole was hurled into the air, and the street pavement was torn up and piled in a heap over an area 20 feet square. A similar eruption took place around the manhole in front of the Field building. The entire day was required to plaster up the rents in the manholes and replace the pavement. Strange to say, the electric wires were undisturbed, and the gas main that lay near the manholes was uninjured. Whether the manhole was struck by lightning, or whether there was only an explosion of gas, was made a question for violent debate among those who witnessed the accidents.

FIREPROOF WOOD.—Edward Atkinson, the Boston economist, says a New England genius has recently discovered a cheap method of dissolving zinc by combining it with hydrogen and producing a solution called zinc-water, and that this liquid applied to certain woods makes them absolutely fireproof. Without attempting to discuss the chemical problems involved in this professed discovery, it may be said that if the discovery be genuine it is one of the most important of the age. It will decrease the loss by fire to an incredible extent and will completely revolutionize fire insurance. It seems hardly credible that wood can be rendered fireproof, at least by any method which will be within the limits of men of moderate means; but, in view of the discoveries of modern science, it is unsafe to say what can or cannot be done. There are already chemical compounds which render cloth and similar fabrics fireproof, and it is at least possible that the inventive genius of a New England Yankee may have accomplished the success with which Mr. Atkinson credits him.

A GREAT FIND OF EARLY PAINTINGS.—Seeking in Lower Egypt, during the present years, for remains of the wonderful Labyrinth of 3000 chambers described by Herodotus, Flinders Petrie seems to have found what he sought, with the pyramidal tomb of its builder, and also came upon a great cemetery, whose existence had hitherto been unknown. This cemetery covers about 100 acres, and dates from the Græco-Roman period, one or two centuries after Christ. From it Mr. Petrie has taken hundreds of mummies, with a vast collection of objects buried with them. These articles include funerary vases, amulets, toys, a tinued copper mirror, a horned lens, a set of leather-workers' needles, a flint knife, and—by far the most interesting and important—a splendid series of portraits, painted upon the cases of elaborately handgilded mummies, and representing the living persons whose remains were placed in these coffins 17 centuries ago. These pictures will add an important chapter to the history of art.

CURIOUS FORMATION OF CRYSTALS.—If a lump of pure granulated chloride of ammonium be carefully introduced into a solution of nitrate of lead, held in a wide-mouthed bottle, there will soon appear pillars of crystals, resembling in some respects the amorpho-crystalline appearance of commercial starch, or, more accurately, angular snowflakes. The result is very beautiful, but, besides, affords an excellent opportunity to notice the mode of formation. The minute crystals of chloride of lead will be seen to rise from all sides, at the base of the forming pillars, and, ascending above their summits, will describe an inward curve, and fall on top. The process being continued, the pillars will rise rapidly. This is interesting as bearing on the cause of crystalline form. If commercial fibrous chloride of ammonium be used instead of that described, the result is extremely remarkable from an artistic point of view, but does not show the currents so distinctly.

FLUORIDE OF NITROGEN.—The supposed compound was formed by passing an electric current from seven ferric chloride batteries through a concentrated solution of ammonium fluoride. After the lapse of a short time, several drops, of oily consistence, were observed attached to the negative plate. On becoming connected with the positive, a thin gold wire, these drops exploded with violence. The compound is highly unstable, being at once decomposed in contact with glass, silica, or organic matter, thus rendering the analysis of the same one of considerable risk. Its explosive violence is even greater than that of the chloride of nitrogen.

A NEW ISLAND.—An island has suddenly risen 3½ feet above the surface of the water in the harbor of Vera Cruz. The city itself was recently visited by a cyclone, an earthquake and a waterspout.

USEFUL INFORMATION.

Substitute for Glass.

A translucent material intended for use as a substitute for glass for many purposes has been introduced in London. This material exhibits the quality of pliancy in the greatest degree; in fact, it may be bent backward and forward like leather, and be subjected to very considerable tensile strain with impunity. It is almost as translucent as glass, and is of a pleasing amber color, varying in shade from very light golden to pale brown. The basis of the material is a web of fine iron wire, with warp and weft threads about 1-12 inch apart. This is inclosed, like a fly in amber, in a sheet of translucent varnish, of which the base is linseed oil. There is no resin or gum in the varnish, and once it has become dry it will stand heat and damp without suffering any change, neither hardening nor becoming sticky. The manufacture is carried out by dipping the sheets edgewise into deep tanks of varnish and then allowing the coating which they thus receive to dry in a warm atmosphere. It requires more than a dozen dips to bring the sheet to the required thickness, and when this has been accomplished it is stored for several weeks to thoroughly set.

It will be readily understood that a material produced in this manner will not be as cheap as glass in its first cost. If it is to obtain a place in the market, it must be either from its greater advantages or from some saving which it effects in the items of erection and maintenance. It is claimed for the woven roofing that it is economical in every way. It absolutely abolishes breakages; a man may fall upon it or drop a ladder upon it without damage. The large size of the sheets, 10x4 feet, renders the joints very few, and these can be made absolutely tight by the use of varnish between the overlapping edges. No glazier is required to apply the material; it can be cut by a pair of strong scissors, and be nailed in place by any ordinary workman. The frames to carry it may be extremely light, and their construction of the simplest. Curved surfaces can be glazed as easily as flat, and if a great amount of light be required, the entire roofing may be made of this material. The sun's heat gets through with difficulty, so that no awnings are needed. The Westminster Aquarium has been lately re-roofed by it, and, it is said, greatly to the comfort of the audience.

THE MANY USES OF CASTOR OIL.—Under the above head, a current paragraph gives the following particulars of the product of the castor bean: The oil is specially adapted for lubricating all sorts of machinery, clocks, watches, etc., and it is an excellent lamp oil, giving a white light far superior to that of mineral oils, petroleum, kerosene, linseed and all other oils, whether vegetable, animal or mineral; it also gives very little soot, and, all things considered, has been pronounced the cheapest oil known. All the great perfumers of London and Paris use castor oil for the manufacture of golden oil, so well known for its property of keeping the head cool, and the skin and its pores, as well as the roots of the hair, soft and open. The oil is used for textile fabrics, to fit them for dyeing or printing, for which purpose the India dyers and printers invariably employ it; and it is one of the best oils for dressing tanned hides and skins of all kinds, on account of its imparting to them such a degree of strength, durability, tenacity and beauty. From the oil cake, in addition to its other uses, a gas is obtained which gives a superior light, some of the stations on the East India railway being illuminated in this way. The oil dissolves completely in alcohol, and this, incorporated with a solution of copal, makes a varnish which, it is said, is very useful in polishing all kinds of first-class furniture, carriages, picture frames, cloths, canvas, etc.

HOW OIL-TANKS SHOULD BE EMPTIED OF OIL. Explosions frequently occur from gas generated from the careless emptying of oil-tanks. Such a one recently occurred on the steamer *Ville de Calais*, employed in the oil trade between Philadelphia and Calais, which excited much interest in shipping circles, particularly among agents and captains identified with sailing vessels, who argue that further explosions will put a decided check upon the building of steamers to compete with them. Respecting the cause of the explosion, one of the parties interested says: "The tanks must have been full of gas, left after the 15,000 barrels of petroleum which she carried had been pumped out; and then there must have been carelessness in examining the tanks. The first thing done after emptying the tanks is to fill them with water. The petroleum still remaining rises on top, and, when the tanks overflow, runs out. It is then that the tanks are examined, and in doing this the same safety lamps are used that are used in mines. Even after the tanks are empty, if a careless sailor, after lighting his pipe, threw the match down the hatch, just such an explosion as rent the *Ville de Calais* asunder might ensue."

GLASS CLOTH.—Duhns Bonnet of Lille, France, has invented a process of spinning and weaving glass into cloth. The warp is composed of silk, forming the body and groundwork, on which the pattern in glass appears, as affected by the weft. The requisite flexibility of glass thread for manufacturing purposes is to be ascribed to its extreme fineness, as not less

than from 50 to 60 of the original strands are required to form one thread of the weft. The process is slow, for no more than a yard of cloth can be produced in 12 hours. The work, however, is extremely beautiful and comparatively cheap. A French paper, commenting on the discovery, says: "When we figure to ourselves an apartment decorated with cloth of glass and resplendent with light, we must be convinced that it will equal in brilliancy all that the imagination can conceive and realize; in a word, the wonders of the enchanted palaces mentioned in the Arabian tales."

ANOTHER EXPLOSION FROM DUST.—An explosion recently occurred in the great manufactory of the American Pencil Company, in Jersey City, caused by the spontaneous combustion of red cedar wood dust, which, passing through the dust-arrester, flew from the sawing-room to the boiler-room. There was a sharp explosion as the fine burst, and the flames flashed 300 feet into the sawdust heap in the boiler room. About 400 girls and men who were at work in the building escaped, with a single exception. Too little attention is paid to the danger from explosions from dust. It is only a few years since any thought was given to the matter—in fact explosions from dust were unheard of 20 years ago. Such explosions were attributed to other or unknown causes.

TO TAKE IMPRESSIONS FROM SEALS OR COINS. To take an exact model of any coin, medal, embossed stamped paper, or, in fact, any device raised or imprinted, cut a piece of card-board, with which form a ring just the dimensions of the impression to be taken, then pour within the said ring melted fusible metal. The carding will prevent the metal from running away, and in a few minutes it will cool, and the impression taken will be the same as the original, but reversed. Fusible metal is a compound of eight parts of bismuth, five of lead, and three of tin, which liquefies at the same temperature as boiling water.

THE LEBEL RIFLE AND POWDER.—It is said that 350,000 Lebel rifles have been issued to the French army. Not only the powder used, which gives them their great superiority, but the construction of the rifles themselves, is a jealously guarded secret. The soldiers who have used the powder in their firing practice do not even know its color. The powder is distributed to them in cartridges. All that is distributed is either used at once or returned to the officers in charge when the practice is over.

TESTING ROOFING SLATES.—In testing roofing slates, the samples should first be carefully weighed, and then put into boiling water for a quarter of an hour. The water should be fairly free from lime, saltpetre and ammonia. The slates are then reweighed, and those that show the greatest increase in weight are those most capable of resisting deterioration.

NEWSPAPERS IN JAPAN.—It will, no doubt, surprise most readers to learn that Japan has nearly 100 daily newspapers. The first was started only 18 years ago.

GOOD HEALTH.

Cold Water Before Breakfast.

A learned physician recently imparted knowledge to a New York man who mixes drinks. The story is told as follows:

A thin, tall man got up early the other morning at the Fifth-Avenue hotel, and, coming downstairs, ordered two glasses of water at the liquid refreshment counter. The trained bartender smiled, but handed out two large glasses full of pure cold water. The man smacked his lips and said it was a healthy drink before breakfast, and one that he recommended.

"You look thin, sir."

"Yes, I do; but if I had not drunk cold water before my breakfast I might have been in my grave long ago. I am a physician, or rather was one before I retired, and have made a study of liquids. Water, drank freely before meals, has a very beneficial result, for it washes away the mucus secreted during the intervals of repose. The membrane thus cleansed is in much better condition to receive food and convert it into soluble compounds. In the morning the accumulation of mucus is specially marked when the gastric walls are covered with a thick, tenacious layer. Now, food entering the stomach at this time will become covered with this tenacious coating, which for a time protects it from the action of gastric ferments and retards digestion. Your man with a tubular contracted stomach, with its puckered mucous lining and viscid contents, a normal condition in the morning before breakfast, is not suitable to receive food. A glass of water washes out the stomach, gives tone and prepares the alimentary canal for the morning meal."—*N. Y. Mail and Express.*

Treatment for Rheumatism.

EDITORS PRESS:—How a man who was suffering with rheumatism cured himself: "I sweat it out. Some think it is the mineral water, but it isn't; it is the sweating," he said. "How did you treat yourself?" "I took a bath in water as hot as I could bear it."

"How long did you remain in the water?"

"Until I was short o' breath—the first time about 20 minutes, the second about 15, and the next a little less. After the bath I was wrapped in blankets and sweat for three hours. I had the rheumatism in my hips and feet. Five baths cured me. I sweat it out."

—ROCK MAPLE.

MAKING THE BLIND SEE.—"A new operation has been discovered by which the sheath of the optic nerve may be opened," said an oculist recently to a reporter for the *New York Mail and Express*. "By this means the pressure upon the nerve can be released, and, in some cases, total blindness cured as well as relieving the brain. The membranes which invest the brain, and are continued down to the eye in the form of a sheath which surrounds the optic nerve, secrete a certain amount of fluid, and whenever there is an excess of this secretion the pressure within the cavity of the skull is increased, and often finds its way down to the level of the eye, causing, in many instances, total blindness. For years oculists have been trying to find a method by which this could be relieved. One oculist tried to feel his way to the nerve without the aid of light by means of an instrument carrying a concealed knife which was projected by a spring. This method failed. Another devised a method of operating by which the sheath was exposed to view. Four cases were operated on in this manner. One case failed; in the other three cases the patient's eyesight was restored, and they were relieved from all pain arising from pressure on the brain. This is a very important discovery, as a great many persons suffer from this ailment."

FRESH AIR FOR THE BABY.—If your work is such that you can't give baby a long daily air bath, do the next best thing. After he has his morning bath, put on his wool hand (knitted hands being the best, for they hug the howels snugly), and a linen shirt can be worn over them during July and August, putting on a little flannel sacque toward night to protect the arms), then the napkins, little socks, and a slip. Disperse with the skirts if it is very warm. Put baby on a blanket on the floor, in a room where the purest air obtainable is in abundance, and the sun is streaming in, purifying every nook and cranny. Let the mite roll and kick to his heart's content while you are busy with your work. Remember this is only a substitute for something better, when mother's duties keep her at home the greater part of the day. When you can take the child out, put on the skirts, etc., and do so. If you have a little yard spot, take along a heavy blanket or fur mat, spread over a place the sun has warmed, and let baby roll around there; it will be better than keeping him fastened in his perambulator, or even in your arms.—*Good Housekeeping.*

NATURAL RECOVERY FROM HYDROPHOBIA.—A 14-year-old boy was recently attacked with genuine hydrophobia. He had been twice bitten by a rabid dog. He began frothing at the mouth, barking, etc., when physicians were called in who tied him down in bed. When water was shown him he became frenzied, and the doctors said there was no doubt of the case being hydrophobia. They watched the progress of the terrible disease until the patient became unconscious the next morning. After a few hours he began to revive, and in the evening was apparently quite well. Local physicians declare this the first case on record of a recovery from hydrophobia. There is no statement as to his having taken any medicine. Nature frequently "works in mysterious ways its wonders to perform." This was probably a case in point. The books record several instances of the disappearance even of unmistakable cases of cancer in the same way.

DEATH FROM SEEDS.—Two people in my neighborhood have died within five or six years from eating grapes, the seeds of the grapes getting into the appendix, which is the term commonly given to a small intestine which leads from the large intestine. It is but a few inches long, and comes to an end like a pocket. What its use is in the digestive economy has not been made out, but when a grape seed, or hit of oyster shell, or any unyielding substance slips into it in its passage through the body, the result, I believe, is uniformly fatal, and death ensues in four or five days, after intense suffering, cramps, inflammation and swelling of the bowels. No remedy avails anything—the pain finally ceases and then the end is nigh. I have known of three young men of brilliant promise who have been slain by the grape seed, a post-mortem in each case revealing the cause of death.—*Rural New Yorker.*

ABORTING FELONS.—The *Therapeutic Gazette* recommends the following treatment for felons, which has proved successful in a vast number of cases when applied before suppuration had begun. The entire finger is covered with ointment of nitrate of mercury, to the thickness of about one-eighth of an inch, and then wrapped in sticking-plaster. This dressing is left on for 24 hours, after which no further treatment is needed.

HOW I PREVENT MY HAIR FROM FALLING OUT.—**EDITORS PRESS:**—Whenever it commences to comb out, I put alcohol on the scalp and gently rub with tips of fingers. Continue the treatment once in two or three days until it ceases to come out. This stimulates the growth. Four or five applications will usually cure for the time. A little rubbed on occasionally is beneficial.—ROCK MAPLE.

ENGINEERING NOTES.

The Largest Flume in the World

Now Being Constructed in San Diego County.

The boom in Southern California, two years ago, inspired the people of San Diego to take measures to secure a supply of water for irrigation and for domestic use adequate to meet all possible wants for both purposes. To do this a company was organized to take out water from the San Diego river at a point in the mountains some 40 miles in the interior. The character of the country over which this water has to be brought is extremely difficult for such work. No less than eight tunnels have had to be excavated, the largest of which is 2100 feet in length. Thirty-six miles of heavy fluming has also been built, requiring the use of 9,000,000 feet of lumber. Some idea of the amount of this lumber may be had from the fact that it constitutes no less than 40 large shiploads. Not less than 315 trestles were required to convey this flume over depressions—the longest of which is 1700 feet and 65 feet high.

The water from the flume is emptied into a large reservoir about ten miles from the city, from whence it is proposed to carry the water in pipes to San Diego.

The work has now been completed to the reservoir. The contractors for the supply of lumber were Messrs. Moore & Smith, lumber dealers of this city. The contractors for building the flume were Messrs. Carle, Croly & Ashernathy of Sacramento. The lumber was mostly redwood from Mendocino county. Redwood strictly clear and free from knots was used exclusively in the box of the flume. This flume is said to be the largest ever built in any country. The work of laying the pipes from the reservoir is now in progress and is comparatively free from any special engineering difficulties.

Some idea of the difficulties that have had to be overcome in the construction of the flume may be gained from the consideration of the fact that much of the lumber had to be drawn 700 and 800 feet up the sides of steep and rocky mountains. The lumber was loaded on cars that ran on a portable track. The cars were attached to a heavy wire cable. The motive power was furnished by a portable engine.

In regard to the mechanical work done in the construction of the flume, all who have examined it declare that it is first-class in every particular. Engineers have carefully fixed the grade every mile, in order, as near as possible, to insure perfection in that important particular. The flume has a uniform grade of 4 7-10 feet to the mile.

A Novel Process for Dredging Water Channels.

The *New York Evening Sun* describes a novel process employed to cut out Sandy Hook har. The steamship *State of Alabama* has been chartered and equipped with nearly \$100,000 worth of machinery of enormous capacity and new design. One of the gentlemen interested in the contract thus explained the plan: "We chartered this ship to experiment with the Riker dredging system. It is a system strikingly original and effective. Over the sides of the ship fore and aft we have constructed outriggers of massive oak timbers, capable of sustaining tons and tons of strain. From these are suspended out dredgers. Now, these dredgers are not at all like the ones you have seen operated by steam engine, raised and lowered between poles, and bringing up a cartload of mud every three or four minutes. That is all done away with. Instead of loading one pocket in a scow in two hours, we load this very ship on which you stand in less than 20 minutes as full as she will hold, and in another 10 minutes can empty her again, without ever stopping our engines or slackening our headway. We run over the ground to be dredged with a full headway, and fill the ship with the sand from the bottom of the ocean as we pass.

"Over the sides of the ship are great iron tubes, three or four feet in diameter, known as telescope tubes. The forward ends can be raised or lowered within a scope of 30 feet. On the other end is a revolving cutter. The rear ends of the tubes connect, through a series of huge valves, with the inside of the hold of the ship. In operation the tubes work very simply and very effectively. The cutter stirs up the sand to a depth of four or five feet, and the force of the vessel through the water makes a suction which causes the sand to rush through the tubes and valves, into the hold of the ship. The valves, opening inward, prevent its running out again. We can throw in a stream of sand and water two feet in diameter, and keep it up till the compartments are filled as full as the vessel will carry. Then we pump off the water from the sand-pits by means of a vacuum pump."

The vessel can be emptied of the liquid mud and sand in about 10 minutes by means of powerful vacuum pumps. The vessel is expected to accomplish in two or three hours what it formerly took a hundred dredges a day to do.

Two tests have been made, and the second worked to the full satisfaction of the inventors, except for some leakage in one of the valves.

ANOTHER NEW COMET was discovered by Prof. Barnard at the Lick Observatory, at 4:51 A. M., October 31st.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MILL.—Amador Ledger, Nov. 3: Frank Littlefield is having a ten-stamp mill erected on his quartz claim near Big Bar bridge, which is called the River mine. He informs us that he has a strong ledge, 12 feet wide, and that it is all milling ore, and from appearances will pay well. The mill when completed will be one of the best of its size to be found in the county. At the North Star mine, drifting in a southerly direction is being prosecuted, and the indications are fair. The managers are satisfied with the developments. No quartz of a paying character has been met with, but they have still strong hopes of finding a good-paying mine.

LINCOLN MILL.—The Lincoln mill has been undergoing some repairs preparatory to starting up. Mr. Stewart expects to start the mill immediately after the first rains, and hopes to run it steadily.

SUTTER CREEK.—Cor. Amador Dispatch, Nov. 2: The hanging wall in the North Star is dipping east, a good indication. The progress made at this mine is unprecedented in the history of mining in the county. The Wildman mine is looking considerably brighter.

DRYTOWN.—Cor. Amador Dispatch, Nov. 2: Barney & Voorhies' sulphurets works will close down the last of the week, there being no more sulphurets on hand. The Cosmopolitan has finished sinking and will start a crosscut east from the 500-foot station the first of next week. The North California is now working two shifts crosscutting west; will reach the shoot of ore in about 100 feet. The Grover is running steady. Everything looks well in the mine. All of the new pipe is now on the ground; are laying it very fast; will be completed about Jan. 1st.

Calaveras.

MURPHYS.—Cor. Mountain Echo, Nov. 1: Mining is still being pursued with energy and perseverance and with prospects of success. The Norfolk Mining Co. is actively engaged in developing its property and extracting quartz of a fair quality. Ore is now being hauled to the Oro Plata mill for reduction. The quartz is not free-milling, but will be crushed and the pulp carried over the concentrators and the concentrates sent to the reduction works for final treatment.

ANGELS.—Mountain Echo, Nov. 1: Work is progressing quite actively at the Ulica mine in this town. The mill is being built as rapidly as circumstances will permit. The work is kept up day and night with the hope of completing the mill before the rain sets in.

NEVILLS.—Blasting surface ground for filling-in purposes in the slopes of the Nevil's mine in this town, is being prosecuted with much vigor. Everything in and about the mine is in first-class order. Sinking will be commenced in a short time.

Fresno.

HILDRETH HAPPENINGS.—Cor. Fresno Republican, Nov. 1: The Abbey shaft is down 700 feet. A level is being run on the ledge, and the indications are very favorable for the development of a large body of high-grade ore. The usual amount of ore is being extracted from the upper levels, and everything in connection with the mill and mine is running smoothly. The Lillie was closed down about a week ago, but will resume operations again shortly.

Mariposa.

At SHERLOCKS.—Gazette, Nov. 3: Capt. Diltz left on Thursday morning for sawmills above, to procure sluice lumber for his mine. He contemplates constructing as soon as possible 500 feet of sluices to his mining operations at his mine on Sherlocks. This mine has always been valuable for its placer as well as its quartz. In years past, whenever there has been a rainy season, such as is needed for placer mining, Captain Diltz, with his string of sluices, about 400 feet in length, has washed out a big gap in the mountain from which no small amount of gold has been extracted. Frequently some rare specimens of from \$1 to \$50 and \$75 are picked up or found in the sluices. His principal operations of placer mining have been, heretofore, on the south end, or "south side," as it is called, of his claim. The quartz vein and claim, which is patented, is about evenly divided by a sharp ridge, which passes through it at right angles; hence, in speaking of it, the "north side" and the "south side" is the distinction referred to. Therefore, on the north side and connected with the patented quartz claim, the Captain has a placer-mining claim, which over-shadows Sherlocks' gulch, known to be so fabulously rich in the days of '49, when the man Sherlock first discovered the rich gulch. Captain Diltz has waited patiently several winter seasons for water enough to justify him in setting the sluices and breaking in upon this placer ground, to which he attaches great value. Feeling that a rainy season, sufficient for mining purposes, is due to California at least once in a decade, the Captain is determined to gamble on the chances that this is the wet winter so eagerly looked forward to and wanted badly at this time.

Mendocino.

SILVER.—Mendocino Dispatch Democrat, Nov. 1: Mr. H. M. Daniels of Anderson valley was in town yesterday and brought with him a bit of intelligence which will be hailed with interest and satisfaction by the people of the whole county. He has discovered a lead of silver ore on his ranch, near Christine, that bids fair to prove a veritable bonanza. A shaft has been sunk to a depth of 75 feet, and six men are now hard at work developing the mine. A sample of surface ore sent to San Francisco last week assays \$9.82 to the ton, and Mr. Daniels is certain that the ore now in sight will run far richer.

Mono.

THE BODIE.—Mono Relief, Oct. 30: During the past week the west crosscut from upraise from 300-foot level was advanced to feet. Upraise from same was extended 5 feet. The winze from the south drift, 400-foot level, was advanced 14 feet. South drift, on first incline level was driven 19 feet. The pump was started and the water is being lowered about 12 feet per day. There are 95 feet of water in the shaft.

THE BULWER CON.—For the past week north

drift, 200-foot level, was driven 19 feet. The north drift, 200-foot level, was advanced 18 feet.

THE STANDARD CON.—East upraise, 300-foot level advanced 14 feet; west upraise, same level, advanced 17 feet; Bulwer level, south drift, advanced 10 feet; south drift, 400 level, advanced 18 feet.

Nevada.

NORTH EXTENSION.—Nevada Herald, Oct. 31: J. G. Hall of Cherokee, who owns the north extension of the Delhi mine, has great faith in the value of his location. His ledge is on the Sierra county side of the Middle Yuba river, and a tunnel can be run which will give from 600 to 700 feet of backs to stope from. Free water can be obtained for power to work the mine cheaply. The pay chute of the Delhi is said to pitch toward the north, and this encourages Mr. Hall in the belief that his location will develop into a good mine.

A BONANZA LYING IDLE.—In the cut near the old Pennsylvania mine, northwest of town, there is a quartz ledge, which in days gone by for a time paid the owners. There used to be a water-wheel on the property which did the hoisting and pumping, but the wheel got out of repair after continued use, and as other expenses fell fast upon the owners, the mine was allowed to fill up with water and has not since been worked. The mine was owned by Wm. Eddy and C. C. Leavitt, the former now deceased. In conversation with Mr. Eddy regarding this mine, some time previous to his death, he informed us that at the bottom of the shaft there still remained a lead 12 to 16 inches thick. Not many crushings were had, but the rock taken out was always high grade. We believe the ground was patented. If the mine was opened up it would be a good thing for the town. It is a pity that such quartz leads as the one mentioned should lie idle. In this vicinity there are many prospects similarly situated, but for want of capital they remain unworked.

A PROSPECTOR'S GOOD LUCK.—Transcript, Nov. 1: J. R. Nickerson came down yesterday from Washington district where he had been prospecting during the past week. He discovered while there an entirely new ledge, which he believes to be one of the richest ever developed in the county.

INCLINE COMPLETED.—Herald, Nov. 2: The new incline shaft at the Derby mine has been completed. The incline comes to the surface near the old McKillican shaft, which was attempted to be put down some 16 years or more ago. Heretofore there has been but one entrance to the mine since the tunnel was filled up, and that through a perpendicular shaft about 600 feet deep. Some time ago a perpendicular upraise was attempted, but it was found too difficult and costly. The incline will give better air for the mine, besides affording egress therefrom in the event that any accident should occur at the main shaft where the hoisting works are located, and the safety of the men is thus better provided for. The additional advantage of the shaft is that it can be used for raising the gravel when it becomes advantageous to do so. The depth of the new incline is about 550 feet.

OUTSIDE CAPITAL.—Grass Valley Tidings, Nov. 1: Our community and mining men generally will hail with delight the intelligence that at last and after many vicissitudes the Coe Mining Co. has effected an arrangement which will result in the development on an extensive scale of the company's property, situated just outside the northern boundary of the municipal incorporation. Mr. Wisley, bookkeeper at the North Star, was the gentleman who held the prior lease, and yesterday—the last day for the lease to run—he returned from Denver, Col., with the news that he had enlisted a wealthy and reputable mining man of that city in the enterprise. Last night the necessary papers were made out, stipulating that development work shall be instituted without delay and that the bond shall endure for one year. A 20-stamp mill with all the latest improvements is to be erected within the same period, at the expiration of which the Denver manipulator is to receive, without further cost, \$5,000 of the 100,000 shares comprising the Coe Co.'s capital stock; and shall be so desired, he may at that time purchase the remaining 45,000 shares at the rate of \$1.50 a share. In the event of non-compliance with any of these terms, all improvements made are to revert to the company. It is understood that Mr. Wisley will be manager of the Coe under the new regime. On Saturday the principal in the enterprise will arrive here. There is now a water-power hoisting and pumping plant on the Coe, and all that is necessary to afford resumption of development work is to oil the machinery, turn on the water and pump out the mine. Water-power for operating a mill is handy. With a 20-stamp mill, economical and intelligent management, the Coe should in due season be placed on the list of dividend-payers.

Placer.

NEW MILL.—Placer Herald, Nov. 3: A large force of men is at work at the Hathaway mine near Ophir, putting up a fine new stamp-mill, while the work of developing and opening up the mine goes steadily on. The company, under the management of Supt. G. W. Horn, means business.

Plumas.

THE DRURY MINE.—Greenville Bulletin, Oct. 31: During the last two months the force of men at work night and day have been pushing tunnel No. 2 ahead. At the face of this tunnel, the backs, up to No. 1, are 200 feet high. The ledge is now between 3 and 4 feet thick and increasing in size. The ore is of very fine quality and is estimated at from \$8 to \$15 per ton. The property now has a fine showing.

ARCADIAN MILL STARTED.—On Saturday last, the Arcadian mill started on ore from the Round Valley Consolidated. We learn that a body of very good ore is being extracted, and that the indications are that the mine will have a prosperous future. There is water in the Round Valley reservoir to run the mill about a month.

San Diego.

QUARTZ.—Julian Sentinel, Nov. 2: We were shown some very fine specimens of gold quartz from the Gold King mine Wednes-day. The mine is evidently a bonanza to its owners.

Shasta.

COPPER CITY.—Courier, Nov. 3: Theodore Popejoy was in town this week. His mines, embracing the Original Williams & Kellinger, contain a 6-foot ledge of milling ore, and from working as

says and tests the quartz will average about \$60 to the ton in gold and silver.

SOLD.—J. W. Conant is reported to have sold a group of his mines to an English company for \$150,000, and received part of the pay down.

IRON MOUNTAIN.—Work will be resumed on the Iron Mountain mill in a few days. Everything about the mine has been placed in first-class order; good work and results are anticipated.

Sierra.

ACTIVE WORK.—Sierra Tribune, Nov. 3: Last Saturday evening the good news was brought to town that the ledge had been encountered in the lower tunnel at the San Luis mine. On Tuesday last Ed Lawrence visited the mine, and from him we learn the following particulars: The vein was reached at a distance of 470 feet in the tunnel. It is about three feet in width and prospects very favorably. The distance between this tunnel and No. 1 is 240 feet, and to the surface it is over 400 feet. It is the intention to run ahead the tunnel a short distance further and then put through a raise and connect with the winze in No. 1 adit. After this connection is made, the work of developing the vein in both tunnels will be pushed ahead with vigor. It is the calculation to erect a mill next season. This company, consisting entirely of home people, has already expended in labor at the mine \$15,000.

SALINAS AND MERCER.—At the Salinas and Mercer mine six men are taking out ore. The mill will be started with J. Moss in charge as soon as water comes. The winter supplies are all in, and in fact all preparations are made for a good season's work. The ore going into the chutes and mill is hard to beat.

THE BUFFALO.—The mill machinery has all been delivered at the Buffalo mine, and the Pelton wheel and pipe has been hauled in this week. The mill building is framed and in a few days will be under cover. The two-story boarding-house and the blacksmith shop are completed. Twenty hands, including six carpenters, are on the pay-roll at present. There are about 1000 tons of ore on the dump. The developments in the mine never looked more favorable than they do now. No. 1 tunnel is run on the vein 350 feet. No. 2 tunnel is in a distance of 200 feet, and the vein in that quarter is looking splendidly. The tunnel on the south side of the creek has been run 60 feet. When this tunnel reaches into the bill 500 feet it will have a depth of 800 feet from surface. There is every reason to believe that a fine body of ore will be opened up on that side. The vein throughout the mine yields immense prospects, and this, together with the fact that it will average 15 or 16 feet in width, warrants the assertion that it is a very valuable property.

THE PERRY CON.—The Perry Consolidated M. Co. has advertised for bids to run 100 feet of tunnel at their claim.

MARGUERITE.—Superintendent Morris is pushing ahead operations at the Marguerite with vim. The new skips for raising water had been placed in position and yesterday the work of draining the mine was begun. There are two of these skips and they have a carrying capacity of 500 gallons each. It is calculated that with these skips in addition to the pumps the mine will be drained in eight days. The 20-stamp mill is being put in shape, and as there is some ore on hand it will be started up at once. A fine set of silver plates for the mill had just been received from San Francisco. Superintendent Morris proposes to make use of his patented process in the mill. As soon as the mine is pumped out a force of men will be placed under ground in making developments and taking out ore. Thirty-four men are at the mine at present, but all of these have not yet gone to work.

MOUNTAIN MINE.—The work of opening the Mountain mine is progressing steadily. No. 3 tunnel is within less than 180 feet from the pay chute. No. 4 tunnel is in about 60 feet. The upper workings of the mine show splendidly, and there has been for a long time sufficient ore in sight to warrant the erection of a big mill. This work, however, will not be inaugurated until next season. Oliver Sanderbaas since the purchase of this mine has expended an immense amount of money in developments.

DECATUR AND NORCROSS CON.—The above-named property is located in Lady's canyon and is owned by Messrs. Abbe and Flint. They have run 600 feet of tunnel at an expense of \$6500. Mr. Abbe alone has expended \$4000 in the enterprise. Work has been suspended for a couple of months past, but it will be resumed again in a short time.

PIKE CITY.—Cor. Nevada Co. Herald, Nov. 2: Mr. J. M. Holcomb, Thomas Callinan and Capt. T. W. Moore, the parties who are engaged in opening the North Alaska mine, went up to that location today. The mill is expected in a few days from the Nevada Foundry. Work on the new 40-stamp mill at the Red Chief mine is being pushed rapidly ahead. Mr. Wilson has a mill completed on his mine, which is situated on an extension of the same ledge, and he will begin crushing as soon as water is obtained. William and Richard Phillips have a mine on an old river-gravel deposit which they have worked for several years with varying success. Last week their tunnel tapped a deposit of very good gravel which has the appearance of being very extensive. In 1864, when this claim was first opened, and for a number of years thereafter, this was a dividend-paying mine. The Phillips Bros. took the property at a time when its prospects were very poor, and it has taken capital and muscle to go ahead.

Trinity.

TRINITY RIVER TUNNEL.—Trinity Journal, Nov. 3: John Bamber will add more planks to the dam and put in floodgates at the head of the tunnel, when it will be closed down for the winter.

NEVADA.

Washoe District.

BELCHER.—Virginia Enterprise, Nov. 3: Gond headway is being made with all repair work. The north drift on the 200 level is progressing favorably. Are running a joint drift to the Segregated Belcher for an air connection. A drain is being cut in the Suto tunnel drift.

SAVAGE.—On the 500 level the southeast drift is out 302 feet. The northeast drift, 230 feet from the north line, is passing into very favorable ground. Are stopping out ore of a good quality on this level (400) from the drifts north and south. On the 500

level (on the Norcross line) are extracting ore and putting in square sets. The ore, thus far, is three sets of timbers (about 18 feet) in width. The ore averages \$50 a ton. Are now extracting 60 tons a day, which is being shipped to the Rock Point mill, Dayton.

CON. CAL. AND VIRGINIA.—The usual quantity of ore has been extracted on the 1400 and 1435 levels and the ore breasts continue to look well. On the 1500 level are stopping ore from the parallel north drift, 60 feet north from the raise above that drift. Continue to stope ore from the southeast drift run from that upraise, 58 feet above the track floor of this level. The usual amount of ore is being extracted from the 1600 level and from the drift, 36 feet above said level south from the Ophir line. Ore of good quality is being extracted from several points on the 1650 level and the prospecting drifts are passing into ground of a promising character. The old stopes at the south end of the mine on this level are also looking and yielding well. The usual quantity of ore has been sent to the mills and the assays will average about the same as last week.

OCCIDENTAL.—In the upper tunnel they are repairing and retimbering the track. In the lower tunnel are repairing No. 2 and 3 chutes, 150 feet south of the north incline winze. The south drift has been extended 20 feet; total, 170. At a point 196 feet north of the winze leading to the lower levels have started a drift to connect with the south drift, and have advanced the same 26 feet. Have extracted 30 tons of ore and shipped to the Atlanta mill 37 1/2 tons of ore; assay value per wagon samples, \$29 per ton. Bullion shipped to San Francisco during October of the assay value of \$9475.06.

GOULD AND CURRY.—On the 200 level work in east crosscut from the top of the upraise from the 300 level (El Dorado level) has been suspended for the present. The west crosscut from the top of the same upraise has been extended 18 feet; total length, 98 feet. Formation, porphyry. On the 625 level the north has been cleaned out and repaired a distance of 160 feet.

BEST AND BELCHER.—On the 300 level in west crosscut No. 1, at a distance of 120 feet from main northwest drift, the winze has been sunk a distance of 13 feet; total depth, 22 feet. Formation, quartz and porphyry, showing some value. From the top of this winze a south drift has been started and advanced a distance of 29 feet; formation, porphyry.

CROWN POINT.—West crosscut No. 2 on the 700 level has passed through a heavy body of clay and reached a solid vein of quartz that assays from \$15 to \$25 a ton, about three-fourths of which is gold. The indications are that the find will prove large and of permanent value. A drain is being cut in the Suto tunnel drift.

ALPHA AND EXCHEQUER.—The north lateral drift in the Exchequer on the 382 level is still in porphyry, as is also the northeast crosscut on the same level. On the 500 level of the Alpha the north lateral drift is in quartz that carries some metal. The face of the south drift on the same level is also wholly in quartz.

HALE AND NORCROSS.—The west drift on the 500 level has been discontinued and the men set to work on repairs in other parts of the mine. Work is still in progress in the north and prospecting drifts. Three square sets of timbers are now in place across the width of the vein cut on the Savage line.

YELLOW JACKET.—The extraction of ore has not yet been resumed. The mine is in better shape both underground and on the surface than ever before in its history, and good work will be done when work is resumed in the ore breasts.

CHOLLAR.—On the 450 level the north drift is in quartz that assays as high as \$10 a ton. On the 750 level the west drift continues in material of a favorable character. The east crosscut on the same level is still in vein porphyry.

CONFIDENCE.—The work of extracting ore was resumed last Tuesday with a full force of miners. The ore is being shipped to the Brunswick mill for reduction. The mine resumes operations in thorough repair throughout.

JUSTICE.—The new mill is nearing completion. It will start up under favorable circumstances, as there is a large amount of ore on the dump ready for reduction, with some good bodies opened up in the mine.

SEGREGATED BELCHER.—Work in the south raise has been discontinued. Are now running an east drift, jointly with the Belcher, for the purpose of obtaining a much-needed air connection.

POTOSI.—The south drift on the 650 level continues in quartz and porphyry. On the 550 level east crosscut No. 2 is still in quartz, carrying some metal. The whole face is in quartz.

ALTA.—The batteries and concentrators are running on ore from the 725 and 825 levels. The mine is not only holding its own, but is also showing some improvement.

SIERRA NEVADA.—West crosscut No. 2 on the 520 level has reached the west wall. West crosscut No. 3 on the same level is still passing through porphyry and quartz.

ANDES.—The repairs to the shaft have been completed and are now cleaning up drifts preparatory to a resumption of underground operations.

UNION CON. AND MEXICAN.—The joint Union drift from the east drift from the Ophir shaft, 1465 level, is out 146 feet in Mexican ground.

SCORPION.—During the past week the west crosscut on the 300 level has been advanced 20 feet, making its total length 152 feet.

OPHIR.—Are cutting a drain and repairing the drift running south from the east drift from the shaft station on the 1465 level.

UTAH.—472 level—East crosscut No. 2 has been extended 50 feet; total, 236 feet. The formation is clay and porphyry.

LAOY WASHINGTON.—Work in the raise above the 725 level is being pushed ahead as usual.

BALTIMORE.—The usual prospecting work is being done and some ore is being opened up.

OVERMAN.—Prospecting work is still continued below the level of the main tunnel.

BULLION.—The usual work is in progress on the 500 and 600 levels.

Eureka District.

ORE SHIPMENTS.—Sentinel, Nov. 3: During the week the following shipments of ore have been de-

livered at the furnaces: From the Hamburg mine, 362 tons; Jackson mine, 215 tons; Dunderberg mine, 40 tons; Silver Lick mine, 24 tons; Helena Mortimer mine, 3 1/2 tons; Diamond mine, 16 tons; Whip-Poor-Will mine, 15 1/2 tons; Eureka Star, 9 1/2 tons; and the Nye Mining Co., 1/2 ton.

BULLION SHIPMENT.—Messrs. Wells, Fargo & Co. shipped yesterday 11 bars of Eureka Co. bullion valued at \$27,000, and during the week the Richmond Co. shipped 45 tons of rich lead bullion.

Jackrabbit District.

ONONDAGA.—Pioche Record, Oct. 31: The boiler and engine on the Independence mine was loaded on Culverwell's wagon Wednesday and hauled to the Onondaga mine at Jackrabbit the next day.

Jefferson District.

RUNNING.—Belmont Courier, Nov. 3: Charles Kanrohat's mill is running nicely, and his mine is looking splendidly.

Pioche District.

YUBA MINE.—Pioche Record, Oct. 31: The Yuba is now employing 30 men and continues regular shipments of high-grade ore. The work on the mine is mainly exploratory, however, the main bulk of the ore being left in the mine for better facilities which the railroad will bring. The deepest exploration is on the 1200-foot level, where the crosscut to the ledge from the shaft is within ten feet of the vein and where an important development is expected soon to be made.

Revelle District.

BELLE AND LIBERTY.—Cor. Belmont Courier, Nov. 3: The mines of Revelle still hold their own. Messrs. Bottomfield and Roman are getting plenty of ore from the Belle mine, and Messrs. Jordan & Marshall have a good thing in the Liberty. The prospects are looking well, but the owners do not wish too much of a rush here for a month or so.

Tuscarora District.

BELLE ISLE.—Times-Review, Nov. 2: East crosscut from north drift, 250-foot level, has been extended 10 feet. The indications are favorable for ore.

FOUND TREASURE.—Some necessary repairs have been made in the old shaft to preserve it for escape and ventilation purposes. The usual quantity of ore has been taken out and sacked for shipment.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—Total depth of shaft 90 feet. Progress has been slow on account of water. Sinking will now be suspended until the machinery is in place.

NORTH BELLE ISLE.—The face shows a little improvement. Some work has been done along the first stope above the 400-foot level. Good progress is being made with the work at the Union mill.

NEVADA QUEEN.—The stopes above the 350-foot level have increased in width, but the ore is not so high grade, the average assay from the battery pulp for the week being \$164.03 per ton. There have been 350 carloads of concentrating ore hoisted; average assay from car sample, \$22.85 per ton.

NAVAJO.—The stopes along the 350-foot level are looking well and are being put in shape for an increased output. The front stope along the 250-foot level is now being opened and stilled. Farther north, stopes are being started on the east vein, 300-foot level. At all points the output of ore is of a high grade. Will commence milling about the 7th inst.

COMMONWEALTH.—150-foot level: No. 2 winze from east lateral drift has been sunk 9 feet; it has been much harder than heretofore. No. 3 north drift from No. 1 east crosscut has been extended 16 feet, passing through seams of quartz and clay, showing a little mineral; 225-foot level: Main south drift from station has been advanced 18 feet, passing through some very hard rock, showing some sulphurets.

ARIZONA.

DIFFERENT DISTRICTS.—Arizona Journal-Miner, Nov. 1: Chas. Girdler returned yesterday from Groom creek. The Sucker mine, Turkey creek district, is being worked by four men. John S. Jones has been running the Standard mill pretty constantly of late. In the old Gray Eagle mine Doc. Bowen is at work taking out gold ore worth \$400 per ton. Walter J. Wright is running the Del Pasco mill on ore from J. R. Linton's Old Reliable mine. J. R. Boyer and Geo. W. Sessions have sold the Norman mine, Cherry creek, to J. H. B. Smith, for \$650. Fred Sattes is working on the Washington mine, Crook canyon, the ore assaying from \$20 to \$40 per ton in gold. Harlan & Barrington have plenty of water again, and are running their mill on Howard ore up to its full capacity. They talk of putting in a larger plant. Lew Elliott, a partner of Geo. W. Sines in the Mollie Stark claim, continues to take out good ore—\$140 gold rock. He has six tons sacked now for shipment to the sampling works. J. N. Rodenburg, from the Bradshaw country, gives a glowing account of the mines in that section. He says that miners were over so encouraged by the outlook for prosperity as at present. A. L. Kerr is in town superintending the shipment of machinery to Weaver district. On the arrival of a few articles which he shipped to-day, he will have his new 20-stamp mill ready to start. J. B. White, who has been superintending the erection of the Boaz mill at Minnehaha flat, came in from that camp to-day. He says the mill is ready to run, but they have not yet succeeded in getting their water supply in. Chas. Degend has just returned from the Santa Maria country, Eureka district, where he has been working a claim belonging to D. C. Thorne. He says the property is a very promising prospect. Mr. Rodenburg says that Jacob Henkle has a bonanza, and no doubt about it, in the Rapid Transit mine. He is taking out \$600 ore for shipment to the Prescott sampling works, and has from six to eight tons out now ready for shipment. He has recently let a contract to two men to sink 150 feet on the claim. The recent rains have furnished an abundant water supply for the Crowded King mine, and Mr. Sheldens is running it on full time day and night. Mr. Rodenburg says it is one of the best equipped mills in the Territory. Thus far they have been able to save by amalgamation up to 95 per cent of the value of the ore, which is good work. Col. H. A. Bigelow, from the Senator mine, reports that a crosscut from the old shaft to the old workings of the mine has been run to a depth of 130 feet, in which a body of ore 14

feet wide was encountered. He says the ore is good, some of it going as high as \$200 per ton, while none of it is worth less than from \$30 to \$40 per ton. The whole force of the Oro Bella company has been taken from the mine and is at work building a wagon road into the property from Minnehaha flat. It will take about a month and a half yet to complete this, when the machinery for their mill will be at once shipped in.

STOCKTON HILL.—Mohave Miner, Nov. 3: Tommy Trimball and a capitalist have commenced work on the Charlotte mine, a property belonging to the Gray brothers. Tommy McMahon has hired a crew and gone to work on his mine, the Young Hyson. The ore produced from this mine compares favorably with any in the district for richness. The Cupel still continues to produce a large quantity of high-grade ore, and Foreman Daly is putting on men as fast as the ground is being opened. The crosscut from the 206-foot level has been connected with the winze from the 120-foot level, which gives a good circulation of air and makes the working of the ore body much easier matter than heretofore. There are a good many rumors floating about about the C. O. D. going to sink another 100 feet, but as yet they have not commenced. That they will do so shortly, there is not a doubt. H. J. Brother, the superintendent of the Rattan mine, left Friday morning for St. Louis. He expects to be absent about two weeks, and will, during his absence, in connection with owners of the mine in St. Louis, contract for the necessary machinery needed for hoisting works and for treating the ore. The mine is looking first-class.

BRITISH COLUMBIA.

ABOUT \$3000 IN 60 DAYS.—Donald Truth, Nov. 1: Work was entirely suspended on Porcupine creek owing to the thermometer registering zero, and all claims have been laid over to June 1, 1889, when work will be resumed and prosecuted with vigor. The boys had several difficulties to contend against, but lack of practical experience was the greatest. The four men in the Discovery company have made \$6 a day to the man for every day they were on the ground, and averaged over \$15 a day for the days actually engaged in sluicing. Their ground was shallow, four feet to bedrock, but they worked intelligently under the direction of an old-time placer miner. Their largest nugget weighed \$11.30, the next \$10.10, and several that went over \$5. The dust is coarse, and was saved by the ordinary riddle, without the aid of blankets, plates, or quicksilver. This company will make preparations during the winter to work their ground on a larger scale next season. Next down the creek is the Sprague Co.'s ground. Although shallow diggings, time was frittered away until the season was nearly closed. They cleaned up about \$100, but their ground is known to be good. The Horseshoe Co. is next. They sluiced from the surface for awhile at the start; but became dissatisfied at the small returns and moved their boxes up the creek above the Discovery claim. They worked there for a time, then moved back to the lower claims again. Finally, they commenced a bedrock shaft, and had it down about 20 feet when they stopped for the season. They cleaned up less than \$100. Next came the Penetrating Co. They turned the creek, built a cabin, sunk a shaft 12 feet, and hunted. The Donald Placer Co. built a good cabin, a good ditch and dam, good sluice-boxes, commenced a good shaft, and stopped work for the season with good intentions. Their first and last cleanup yielded exactly \$7.96. Next came the Michigan Co. They were the first to begin sluicing, and the first to quit. They also sunk a shaft, but, for some reason, abandoned it before getting down to bedrock. They made a small cleanup. Next came a company that did not do anything but put up stakes to mark their 300 feet. Next, and last, the French Co., who have a shaft down over 37 feet. There is no question but gold is in the creek in paying quantities; but there is also no question that to obtain it the owners of the deep ground will have to do more intelligent and more persistent work next season than they did this.

THE TOAD MOUNTAIN COUNTRY.—Donald Truth, Nov. 1: On the last trip up to Revelstoke the steamboat Dispatch had aboard several well-known mine-owners from Toad Mountain. One of the Hall boys and John McDonald were among the number. They report having received returns from a trial shipment of 22 1/2 tons of ore sent to Anaconda, Montana, for reduction. The shipment netted them an even \$7000, after paying transportation and smelting charges that aggregated \$80 a ton. The ore carried \$308 in silver and \$2.50 in gold to the ton, besides giving 28 per cent in copper. The pay-streak from which this ore was taken is about two feet in width, although the ledge is 30 feet wide in places. Arrangements are being perfected to keep men at work on the claims all winter. About 100 men are in that camp at present.

COLORADO.

NOTES.—Georgetown Courier, Nov. 3: Mineral Chief is being opened at four places, and two more are to be started. Three are in big ore. Oneida is erecting an additional hoisting plant and will commence sinking on No. 1 adit. The Mary Foster shaft is to be sunk to a depth of 400 feet. Ore mills about \$300 per ton. A plant of hoisting machinery is being put up on the Lamartine, head of Trail creek. The breast of the 750-foot level on the Colorado Central shows an eight-inch vein of solid ore. Five men are at work extending the sluices on the Rombauer placer. The cleanup for the season is said to have been very satisfactory. The Golden Smelting Co. is making its last cleanup and will close the works before many days. Unfair treatment by the railroads is the cause. A lot of five tons of ore from the Jo Reynolds, milled at the Miners' Works in one class, returned nearly \$800 per ton. The ore is chock full of gray copper. Coley & Johnson, who have been milling their ore from the Trinidad through an arrastra, have been having very good luck. Their last run of nine days netted them \$212. Brown & Purcell are making money on the Edinburg—stopping over the second level. John Rutherford is driving the first level. Weiser & Co. are driving the second level. C. W. Evans has discovered another lode near the Evening Star, on McClellan mountain. Surface material assayed a few days ago, returned over 300 ozs. silver per ton and 13 ozs. gold. The tunnel level on the Little Jack has been extended 60

feet by the new lessees. They are driving for the ore chimney, which is still more than 100 feet ahead of them.

DAKOTA.

FLOAT.—Deadwood Pioneer, Nov. 1: The Axion Mining Company, with five good claims on Black Mountain, will be organized as soon as seal and charter arrive. We understand the capital has all been subscribed for except, perhaps, 10,000 shares. Albe Holmes was in from Carbonate yesterday and reports steady operations at the Albe, with encouraging results. Occasional shipments are made to Omaha, and the mine continues paying for its own development. The Bullion company has put a force to work taking out ore for the Galena smelter. Several tons have already been shipped. Good ore has recently been struck on the Eclipse, and its superintendent, Dick Richards, is confident it will shortly prove as valuable a piece of property as the Ruby Bell, adjoining. Another carload of coke for the Galena smelter is supposed to have reached White-water Sunday night. The plant will probably blow in to-day for a continuous run. The September cleanup at the Jenny Jewett mill amounted to \$7800 (mint returns), and that for October promises to be even larger.

RUBY.—Deadwood Pioneer, Nov. 1: A trip among the Ruby mines at present causes even an old-timer who has been away for a few months to open his eyes with pleasure and surprise at the new ore bodies that have been opened up very recently. The camp is filling up with men doing assessment work and more fully developing the numerous ore bodies. At the Eclipse, Dick Richards is driving a tunnel, running east from the south fork of White-tail. The tunnel is in about 40 feet. Ore was found 20 feet from the start, and at present is dipping considerably into the hill. The Eclipse cabin is filled with men at work in the vicinity.

TROY.—Hy. Ellington, superintendent of the above mine, has a force of men at work sinking a shaft to strike the continuation of the Harmony ore vein. Supt. Ellington has been engaged recently with Geo. Hopkins in surveying and ascertaining the pitch of the Tornado and Harmony ore vein, and finds from such observation that he will have to sink 52 feet to strike the regular ore body. Ore has been found in two shafts and a tunnel on the Troy that runs well.

MIKADO.—The old shaft is being retimbered and put in shape to commence sinking.

GLENWOOD.—Has run a surface open cut from creek level to nearly the top of hill and struck a 2-foot vein of good ore.

IDAHO.

VENUS.—Ketchum Keystone, Nov. 1: V. Domski shipped three tons of Venus ore Monday, which assayed 23 ounces in silver and 45 per cent lead. This is a little lower grade than the previous shipment, but may be considered the very highest grade lead ore mined in the Wood River country. There is plenty of ore now in sight for several months' stopping.

PHILADELPHIA AND IDAHO CO.—It is rumored that the Philadelphia & Idaho Co. will resume operations in their immense smelters at this point early next spring.

SNAKE RIVER.—The Mountain Home Bulletin says that Snake river is reported to be lower than ever before known at this season of the year. This gives the miners a great advantage in being able to work the bars at a greater depth than usual, and will cause much activity in placer mining on the Snake until a rise takes place.

BADGER.—The new hoisting works for this mine have been shipped in and are now being put in place. The Badger, according to every report, is in fine condition, exhibiting large ore bodies and an almost exhaustless extent of "virgin" ground.

MONTANA.

THE CARBONATE MINE.—Montana Mining Review, Nov. 1: The Carbonate mine, located four miles from Marysville, is looking much better than ever before. The tunnel is now in about 325 feet, and a raise was made to tap the shaft for air. The vein has widened and is now about seven feet wide. This is a very fine property and will prove a bonanza to its owners, Messrs. John and Andrew Neenan, of Marysville.

THE LEE MOUNTAIN MINE.—Work was resumed on the Lee Mountain mine at Rimini to-day (Wednesday) with a force of 20 men, and will probably be kept up all winter. It is also expected to start up the concentrator at Rimini within a short time, but before doing so the works will be overhauled and repaired.

THE GREAT FALLS SMELTER has started up and miners can have their ores worked at home. The company is now buying ores in any quantity. Their office is in the Gold block, Helena.

ORO FINO AND THE CHAMPION.—Montana Mining Review, Nov. 1: Everything is looking favorable in the Oro Fino district for a great mining camp at that point, and one which bids fair to rival Deer Lodge county's other famous mining section—the Phillipsburg country. As development work is prosecuted, it seems to demonstrate that in the near future the now nearly obscure Oro Fino region will reign a queen among the great mineral kingdoms of Montana. Probably no other property has done so much to prove the worth of this district as the Champion lode, in which another new strike is reported as having just been made, a 3-foot streak of ore appearing in the vein that samples over \$500 to the ton. The shaft has been sunk to a depth of 250 feet, and a crosscut is now being run. The ore referred to was struck 6 feet in on the crosscut. The Champion has a ledge of ore 30 feet wide, from which a sample cannot be taken anywhere that will run less than \$10 per ton, and from that figure up.

THE NEW SMELTER.—The Helena and Livingston Smelting Co. is pushing work as rapidly as possible on their plant in East Helena. Three stacks are completed, one being 140 feet in height and the others 100 feet each. The sampling works are about completed and will be started up by the middle of next month.

A GOOD CLEANUP.—H. S. Horton and Dave Orear, at the head of Dry gulch, have closed down

operations in their placer diggings for the year. Their last cleanup was made after a run of 20 hours' duration, with a small stream of water, and netted them \$54.90—something over \$4 per hour, which indicates that they have some remarkably rich diggings, and if they only had plenty of water could take out "bushels of gold."

NEW MEXICO.

CARLISLE.—Western Liberal, Nov. 1: The Carlisle Co. keeps 12 men employed on development work. One of the territorial papers recently announced that the smelting plant at Carlisle was a failure. At the time the announcement was made the smelter was netting \$7000 per month.

DEVELOPMENT WORK.—Silver City Enterprise, Nov. 2: The ore vein in the Golden Giant at Pinos Altos has widened to 34 inches of good solid ore. A pipe line from a spring at the head of Mill creek, three miles from the Key mill, will be laid by the Key Co. and an abundance of water obtained for milling purposes. W. C. Tonkui came in from the Ruby mine at Gold Hill this week. The mine is now showing about 14 inches of very rich ore. The sale of the Atlantic to the Deep Down Mining Co. will undoubtedly be consummated this week. J. R. Johnson, the energetic lessee of the Old Man mine, while in town yesterday informed a representative of the Enterprise that he has opened up a pocket of rich ore in the mine. It is at a depth of about 130 feet, and gives every indication of being a bonanza, such as ushered the mine into notoriety here a few years ago. Work is steadily progressing on the Santa Rita mines in the way of preparing them for real business in the near future. Dr. Mahone some time since gave Ed Moulton a contract to furnish 25,000 feet of lumber for timbering purposes, and the order has been lately enlarged upon and the work of timbering and treating the mine of water is now going on under the watchful eye of Dr. Mahone, assisted by Mr. Metcalf of Boston. The amount of ore the Santa Rita and Hanover mines are capable of turning out would make things hum in this section if they were worked to their full capacity. M. W. Bremen, general manager of the Bremen Co., has adopted the lease system and has already made several contracts with miners. His lease provides that in case the men fail to make \$3 per day, they pay no royalty. A large number of men could find room in the mine on fairly good ground. One leaser recently shipped several tons of ore which run 145 ounces per ton. The men working on day's pay are taking out good ore. Day and night shifts are working in one part of the mine. New ground is being opened up and altogether the prospects are the most favorable.

OREGON.

PLACER CLAIMS PURCHASED.—Bedrock Democrat, Nov. 1: The placer claims of Oscar Benson at Granite creek were recently sold to Mr. L. H. Bowman of Walla Walla. Mr. Bowman arrived here last Sunday on his way to Granite to examine his property and see what was needed to equip them for extensive operations the coming spring. The claims consist of 40 acres of fine gravel banks covered with a ditch of unlimited supply of water, capable of furnishing all the water necessary for the working of these mines and other claims adjacent.

THE RED CLOUD.—The owner of the Red Cloud mine in Granite district, Mr. Ike Klopp, has perfected arrangements whereby extensive development work will progress on the property all the coming winter. The mine has been worked for many years past on a limited scale and gives every indication of being a valuable property.

SPARTA MINES.—Bedrock Democrat, Nov. 1: Jay Guy Lewis, M. E. of Sparta, owner of the Del Moore group of mines and other properties, is on a business trip to this city. He gives a good account of mining operations in his district and predicts a grand future for the camp. The mines will be operated more extensively than ever in the spring, he says, as several Eastern companies are taking hold and will work them on a grand scale. The Del Monte group is showing up fine, with thousands of tons of rich gold ore on the dump awaiting reduction by mill.

THE PANDORA.—C. C. McCoy arrived from Walla Walla last Sunday on his way to Huntington to inspect the Pandora mining property, in which he is one of the principal owners. The property is situated about one mile from Huntington and about the same distance from the railroad track of the Oregon Short Line. The working management of the property is in the hands of Judge Lehman. Development work on the Pandora property has been pushed vigorously all of the past summer, until at the present time we understand the ore chutes and veins show up splendidly, and besides having hundreds of tons of rich free-gold ore on the dump, a much larger body of ore is to be seen in the tunnels.

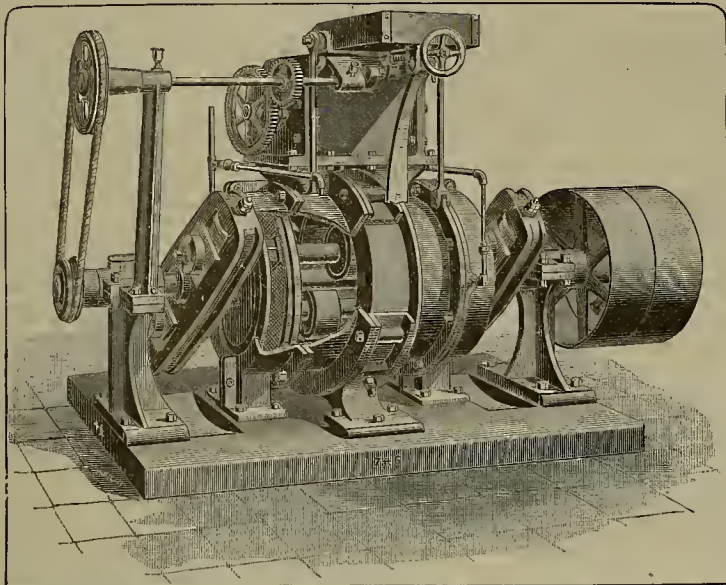
WASHINGTON.

CLE-ELUM'S BIG BORE.—Evensburg Capital, Oct. 27: The hole at Cle-elum has attained a depth of nearly 700 feet, and has revealed quite a number of the hidden treasures of Mother Earth. Besides the seven-foot vein of superior coal, it has uncovered a large bed of superior potter's and fire clay which can be utilized in the manufacture of fire-brick and pottery. The demand for the former will be very great when the furnaces and smelters contemplated in Kittitas valley are built and in active operation. Billy Price returned from a 10-days' trip to the mines. He stated to a reporter that the camps were in the best spirits. Several capitalists were there. The superintendent of the Arlington is making preparations to work all winter and has a large force of men. The War Eagle and others are all busy. The Flannagan Bros. have a shaft down 300 feet and have found two feet of the choicest gold yet discovered. It is reported that they have sold one-fourth interest to San Francisco parties for \$20,000.

PLACER MINING NEAR THE METHOW.—At the mouth of the Methow parties are engaged in placer mining on a big scale. The water of the Methow is flumed down the Columbia some distance and with it the bars of the Columbia are being washed, the help employed being mostly Chinese. In fact, all along the Columbia can be seen Chinese washing out shallow places.

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This Mill, with a weight of less than 9000 pounds has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

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OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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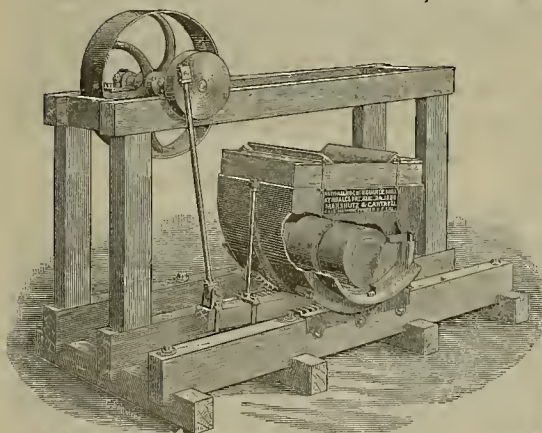
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6. There is no wear except on shoes and dies.
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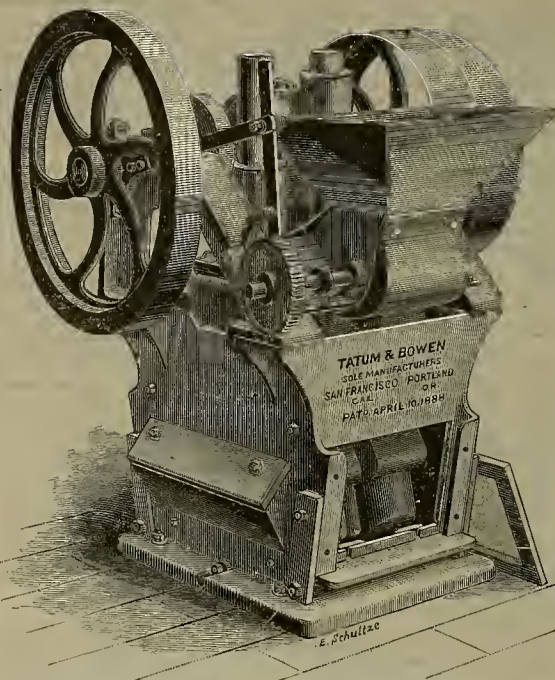
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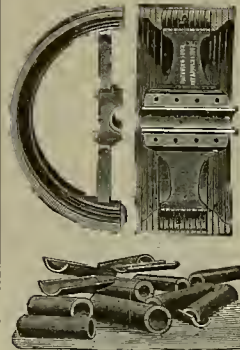
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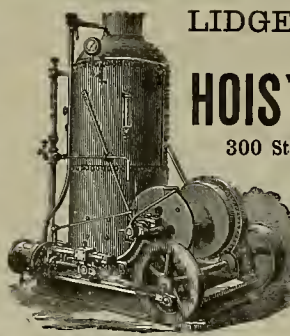
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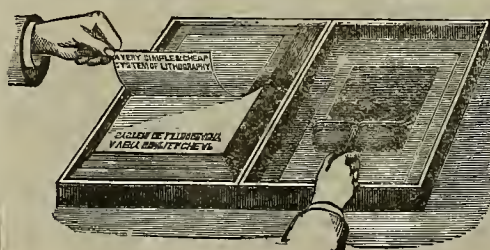


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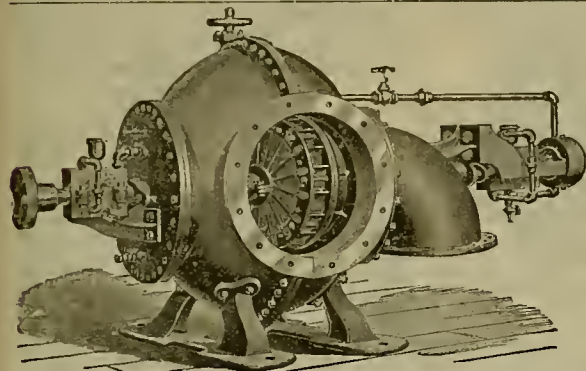
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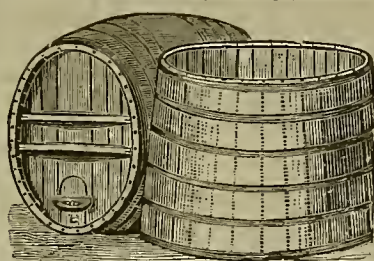
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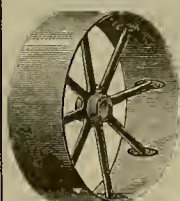
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Platinized iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.



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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Nov. 8, 1888.

Business the past week was very dull, but not more so than was to have been expected at the close of one of the most exciting elections witnessed for several years. Now that it is of the "by-gones," trade is beginning to drift into its usual channels. The money market continues to work easy, although in some quarters there is quite a demand for funds, particularly from dealers in mining stocks. The disbursements in this State for wheat, barley, fruits, hops, wool, etc., since July 1st of this year, are estimated to aggregate over \$30,000,000, which will be increased by the close of this year to fully \$40,000,000. This large sum is gradually finding its way back into the money centers in this State, with, as usual, the bulk coming in this city. Unless there is a large speculative movement in mining stocks, money will soon be quite easy, easier than for over two years.

SILVER—In the local market silver has manifested a strong tone, with an advance obtainable at the close in sympathy with higher quotations coming through from London. A sale was being negotiated yesterday, but at this writing we are not advised if it was closed or not. News from the various mining districts is closely scanned, particularly from the Comstocks, owing to the large preparation made to crush more ore this winter than ever before. Very important work, crosscutting, is to be inaugurated soon in the following mines: Seg. Belcher, Crown Point, Belcher, Alpha, Exchequer and Con. Imperial. In all these, particularly in Alpha and Exchequer, it is confidently asserted that good bodies of paying ore will be uncovered, of which the percentage in silver will be quite small. If the work in the other mines uncover ore bearing nearly all gold, then the silver output of the mines will not be greatly increased over that of the last season, or when water was available to run the mills. The Nevada mill, 60 stamps, is about ready to start up with electric motor. The ore it will run on is quite a percentage of silver. London cables came through to-day quoting silver at 43 1/2, while New York telegrams reported 94c. In our market, sales were made for shipment by the last steamship for China at 93 1/2 to 94c. At the close the market is quiet but firm at 93 1/2 to 94c. The shipments of silver by sea from this port last month aggregated \$416,000 in silver bars. For the first ten months of the year they aggregated \$8,348,400 against \$6,713,715 for the like time in 1887.

QUICKSILVER—The market is without any particular change to report. The demand is good.

LEAD—The unsettled market at the East and also abroad causes our market to waver and unsatisfactory to the selling interest. Buyers only operate in a hand-to-mouth way.

COPPER—Among the better informed, there is a growing impression that the situation is far from satisfactory, notwithstanding rumors of new syndicate deals in Europe. On October 20th, the Calumet & Hecla's stamp mill got out 83 tons of mineral for the 24 hours ending that day. This is the largest output on record. Eighty-three tons of mineral figure at fully 123,000 lbs. of fine copper.

TIN—The European market for pig is still under speculative influences. Our market is very strong, although buyers do not appear disposed to anticipate wants to any extent. For tin plate the spot market is dull but firm, owing to prices being relatively below the cost of importation. For parcels to arrive or for prompt shipment, there is still a good trade doing at full prices.

IRON—The market is strong for all kinds. The high freight rates from England make it difficult to meet buyers' views for forward delivery. The consumption is only fair for the season of the year.

COAL—The imports into this port in October were as follows in tons: Australia, 18,032; Great Britain, 900; Eastern, 5100; British Columbia, 30,738; Seattle, 26,052; Tacoma, 22,755; other mines, 7803; total, 111,222 tons. The market is very strong, particularly for Australian and English; the former, owing to the strike, and the latter owing to the high rates of freight from England to this port. The output of coast coal is steadily increasing.

Eastern Metal Markets.

By Telegraph

NEW YORK, Nov. 8, 1888.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday	43	93 1/2	\$17 30	\$3 92 1/2	\$22 70
Friday	43	93 1/2	17 25	3 72 1/2	22 00
Saturday	43	93 1/2	17 25	3 72 1/2	22 00
Sunday	43	93 1/2	17 30	3 67 1/2	22 70
Tuesday	43 1/2	94	17 50	3 72 1/2	22 70
Wednesday	43 1/2	94	17 50	3 72 1/2	22 70

The market closed as follows: Manufacturers pay the late advance in borax readily. California refined is quoted at 8 1/2 to 8 3/4; concentrated, 8 to 8 1/2. Quicksilver is dull at 65 for the extreme price, though the supply is not large. Lake ingot copper is quiet at \$17.45. November and spot \$17.50. Calumet and Hecla reports its output at 390 tons, which is the largest record for a single month. Pig lead is selling at \$3.77 1/2, with a rather more settled feeling. Refined petroleum in barrels is quoted at 7 1/2 cts, in plain cases at 9 1/2 cts.

By Mail

The following is the latest from the "New York Metal Exchange Market Report":

TIN—Alone has exhibited a fair degree of life under the circumstances, with considerable irregularity in price, the foreign market having been spasmodically quite active. There has not been sufficient interest, however, to culminate in actual business, so tons being the "grand" total of sales for the week. Values have tended toward the establishment of uniformity between the several options; an easing off of a quarter cent on spot, and simultaneous appreciation

of 5 and 15 points on futures, having brought prices nearly to a level for the whole list.

COPPER—Sales of 50,000 pounds were reported early in the week, but apart from this the metal has been almost ignored; and nominal prices have remained practically unchanged since last Saturday.

LEAD—So long the center of speculative attention, is still the article most freely dealt in, but almost all the dealing has been for the liquidation of contracts; 2055 tons having been sold for this account, and only 228 tons in the regular way. The natural effect has been to weaken prices, which stood up fairly well, however, under the first pressure; giving way less than 10 points until toward the end of the week, when they sagged off about 20 points more, although moderately steady in tone.

SPELTER—Has been lost sight of completely in the excitement except to the extent of sympathizing with a decline of about 20 points in nominal values.

PIG IRON—There is absolutely no change in this department, consumers' requirements calling for everything that the furnaces can turn out. There is some inquiry from large consumers, but it has not been found possible to close business, as buyers are not willing to pay full quoted rates, nor are sellers willing to accept the bids which are being made. The consequence is a "hand-to-mouth" trade, until such times as either buyer or seller will yield their point.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Billiton Tin, @—; Banca Tin, @—; Baltimore Copper, \$16.00 @—; Orford Copper, \$16.00 @ 16.25; P. S. C. Copper, @—; Foreign Lead, \$5.00 @ 5.25; Foreign Spelter, \$5.40 @ 5.50; Antimony, \$9.75 @ 13.50.

San Francisco Metal Market.

Wholesale.

Thursday, Nov. 8, 1888.

ANTIMONY—French Star	13 @ 14
BORAX—Refined	74 @ 75
Powdered	74 @ 75
Concentrated	62 @ 71
COPPER—	
Bolt	26 @ 27
Sheeting	26 @ 27
Ingot	16 @ 19 00
Fire Box Sheets	@ 26
IRON—Glengarnock ton	@
Lightton, ton	@ 32 50
American Steel, 1400	@ 31
Oregon Pig, ton	@ 31
Olay Lane White	@ 24 50
Shotts, No. 1	@ 29 00
Bar Iron (base price)	22 @ 23
Chrome Iron ore, 50 ton	8 @ 10 00
LEAD—Pig	5 @ 5 1/2
Sheet	5 @
Buck, 5 bag	1 65 @
Shot, discount 10% on 50 lbs	Drop, 5 bag
Ohilled, do	2 05 @
Steel—English, lb	20 @ 20
Cast iron tool	9 @
Black Diamond tool	10 @ 16
Pick and Hammer	8 @ 10
Machinery	4 @ 5
Toe Calk	4 @ 5
Tires—Coke	6 @ 10 15
Charcoal, 14x20	6 75 @ 7 25
Do roofing, 14x20	5 50 @ 5 52 1/2
Pig iron, lb	24 @ 25
Flasks, new	1 06 @
Flasks, old	85 @

PRICES OF COAL "TO ARRIVE."

Australian	\$11 60 @ 12 00	Cardiff	11 @ 11 15
Liverpool Stm	12 00 @ 12 50	Lehigh Lump	15 00 @ 15 60
West Hartley	12 60 @ 13 00	Cumberland bk17	00 @ 18 00
Scotch Splint	12 00 @ 12 50	Egg, hard	15 00 @ 15 50

Mining Share Market.

The excitement of the election has distracted attention from mining stocks during the past week, and the market is without special interest. The stockholders and officers of the Confidence mine are engaged in a little row over a refusal to show the books. It is said that the affairs of the mine have been conducted of late rather in the interest of stock-johning than of stockholders. The dissatisfied stockholders are to meet and discuss the matter.

The following mining companies have cash on hand according to the monthly statements placed on file: Alpha, \$3169.89; Alta, \$26, 913 65; Andes, \$2003.79; Belcher, \$26,014.81; Belle Isle, \$771.52; Best and Belcher, \$951.72; Bodie, \$38,222.15; Bullion, \$45,146.64; Bulwer, \$13,137.35; Caledonia, \$570.94; Con. California and Virginia, \$114,461.45; and unsold bullion valued at \$77,884.32, with further shipments to arrive; Confidence, \$31,768.88; Con. Imperial, \$1633.89; Crocker, \$6627.25; Diana, \$4815.85; Dudley, \$383.16; Exchequer, \$19,339.05; Fund Treasner, \$360.19; Hale and Norcross, \$3414.83; 30; Holmes, \$820.11; Independence, \$3414.91; Julia, \$503.08; Locomotive, \$3668.12; Lady Washington, \$25,218.67; Mexican, \$17,594.18; Mono, \$24,227.75; Occidental, \$1055.90; Ohir, \$35,475.33; Overman, \$193.46; Pondera, \$290.52; Scorpion, \$3547.70; Sierra Nevada, \$2686.40; Syndicate, \$9404.43; Standard, \$16,620.34; Summit, \$9308; Tioza, \$1480.87; Union, \$7146.59; Utah, \$965.89; Weldon, \$2940.90.

The following companies have an indebtedness: Benton, \$25,000; Challenge, \$3604.43; Chollar, \$39,871.61; Commonwealth, \$28,144.58; Crown Point, \$25,352.02; Del Monte, \$15,172.41; Grand Prize, \$42,787.06; Gould and Curry, \$8032.44; Navajo, \$15,487.50; N. Nevada, \$27,409.52; North Belle Isle, \$51,160.81; North Commonwealth, \$22,006.78; Peer, \$4858.48; Peerless, \$4325.34; Potosi, \$42,637.51; Savage, \$79,775.18; Seg. Belcher, \$20,910.79; Tuscarora Con., \$411.20.

THERE is a society of women in Roseburg, Oregon, whose business it is to attend to the driving down of all nails that stick up from the sidewalks.

Four corporations were organized last week to build cable railroad in Seattle.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINQ'T. SALA.	SECRETARY.	PLACE OF BUSINESS.
American Eagle M Co.	California.	1.	10. Sept 20, Oct 25.	Nov 15. J. M Reynolds.	303 California St
Alfa S M Co.	Nevada.	38.	50. Sept 28, Nov 5.	Nov 28. L Osborn.	309 Montgomery St
Alta S M Co.	Nevada.	31.	25. Oct 5, Nov 12.	Dec 3. B Burris.	309 Montgomery St
Alpha Con M Co.	Nevada.	21.	87 1/2. Nov 3, Dec 8.	Dec 28. C E Elliott.	309 Montgomery St
Alpha Con M & M Co.	Nevada.	2.	25. Nov 3, Dec 8.	Dec 28. E E Elliott.	309 Montgomery St
Baltimore S M Co.	Nevada.	3.	25. Sept 22, Oct 25.	Nov 13. A R Crim.	402 Montgomery St
Belcher M Co.	Nevada.	36.	50. Sept 13, Oct 23.	Nov 12. J Crockett.	327 Pine St
Bodie Con M Co.	Nevada.	9.	50. Sept 24, Oct 29.	Nov 3. G W Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	41.	25. Oct 16, Nov 21.	Dec 11. L Osborn.	309 Montgomery St
Benton Con M Co.	Nevada.	18.	1. Oct 29, Dec 3.	Dec 24. V B Allen.	340 Pine St
Crown Point & S M Co.	Nevada.	50.	50. Oct 2, Nov 5.	Nov 29. J Newlands.	329 Pine St
Cholla M Co.	Nevada.	26.	50. Oct 8, Nov 13.	Dec 5. C E Elliott.	309 Montgomery St
Con Imperial Co.	Nevada.	25.	05. Oct 16, Nov 21.	Dec 12. C L Mc Coy.	349 Pine St
Caledonia S M Co.	Nevada.	43.	15. Oct 19, Nov 21.	Dec 12. A S Groth.	414 California St
Del Monte M Co.	Nevada.	1.	25. Oct 15, Nov 20.	Dec 12. J W Pew.	310 Pine St
Gould and Curry S M Co.	Nevada.	4.	16. Oct 25, Nov 30.	Dec 21. J Stadfeld.	309 Montgomery St
Con Imperial Co.	Nevada.	60.	30. Oct 2, Nov 9.	Nov 30. A K Durior.	309 Montgomery St
Gr Western Q M Co.	California.	2.	15. Sept 18, Oct 22.	Nov 12. A Halsey.	328 Montgomery St
Grand Prize M Co.	Nevada.	19.	25. Oct 13, Nov 17.	Dec 5. R R Grayson.	327 Pine St
Horseshoe Bar Con M Co.	California.	1.	25. Oct 9, Nov 17.	Dec 10. D M Kent.	330 Pine St
Justice M Co.	Nevada.	47.	25. Sept 25, Oct 31.	Nov 19. E E Kelly.	419 California St
Keyes S M Co.	Nevada.	3.	25. Oct 22, Nov 24.	Dec 15. M P Minor.	328 Montgomery St
Mayflower Cravel M Co.	California.	43.	50. Oct 14, Nov 16.	Dec 10. J Morizio.	328 Montgomery St
Mono G M Co.	California.	26.	50. Sept 20, Oct 23.	Nov 28. G W Sessions.	309 Montgomery St
Moutrose M Co.	Colorado.	1.	1. Oct 3, Nov 12.	Dec 15. F E Luby.	330 Pine St
North Belle Isle M Co.	Nevada.	13.	19. Oct 23, Nov 27.	Dec 19. J W Pew.	310 Pine St
North Con. monwealth M Co.	Nevada.	1.	30. Oct 15, Nov 19.	Dec 11. J W Pew.	310 Pine St
Potosi M Co.	Nevada.	31.	50. Oct 1, Nov 6.	Nov 27. O E Elliot.	309 Montgomery St
Planet Con Drift M Co.	California.	7.	01. Sept 23, Oct 25.	Nov 13. J S Smith.	Grass Valley
Piedmont M Co.	Washington.	1.	1. Oct 23, Nov 27.	Dec 19. J Halsey.	309 Montgomery St
Russell Reduction & M Co.	California.	3.	1. Oct 18, Nov 26.	Dec 17. J Moniz.	328 Montgomery St
Savage M Co.	Nevada.	71.	50. Oct 4, Nov 7.	Nov 27. E B Holmes.	309 Montgomery St
Tuscarora Con M Co.	Nevada.	1.	05. Oct 1, Nov 4.	Dec 5. J F Scovil.	309 Montgomery St
Utah Con M Co.	Nevada.	5.	35. Oct 1, Nov 8.	Nov 26. A H Fish.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Bodie Tunnel Co.	California.	C C Harvey.	303 California St.	Annual.....Nov 12
Confidence M Co.	Nevada.	A S Groth.	414 California St.	Annual.....Nov 9
Challenger M Co.	Nevada.	J L McCoy.	329 Pine St.	Annual.....Nov 15
Harrington M Co.	California.	C W Pew.	310 Pine St.	Annual.....Nov 15
Mountain Tunnel M Co.	Nevada.	E Landis.	309 Montgomery St.	Special.....Nov 15
Norta Gould & Curry M Co.	Nevada.	C H Mason.	331 Montgomery St.	Annual.....Nov 17

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con. California & Va M Co.	Nevada.	A S Groth.	309 Montgomery St.	1.00.	Oct 10
Confidence M Co.	Nevada.	A S Groth.	414 California St.	1.00.	Aug 6
Eureka Con M Co.	Nevada.	H R P Hutton.	306 Pine St.	25.	July 9
Gr Western Q M Co.	California.	R W Heath.	318 Pine St.	25.	Aug 27
North Star M Co.	California.	D A Jennings.	310 California St.	50.	July 11
Peerless & Norcross S M Co.	Nevada.	J F Lightner.	309 Montgomery St.	50.	Aug 8
Idaho M Co.	California.	W H Halsey.	Grass Valley.	50.	Oct 11
Pacific Borax, Salt & Soda Co.	California.	A H Clough.	230 Montgomery St.	1.00.	July 10
Standard Con M Co.	California.	J W Pew.	310 Pine St.	65.	June 12

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

CALIFORNIA G. M. Co., Nov. 1. Location, Columbia district, Tnolunne Co. Capital stock, \$10,000,000. Directors—H. C. Partridge, C. A. Warren, James Tohin, W. P. Keyes and E. F. Russell.

HANLEY-DAWSON Co., Nov. 1. Object, to deal in hardwood lumber. Capital stock, \$100,000. Directors—James Clyne, Edmund Dawson, James Hanley, W. C. Hanley and Geo. H. Mayhew.

SUPREME LODGE, ORDER OF GOLDEN SHORE, Nov. 1. This is a social and benevolent incorporation. Directors—H. W. Mathews, W. W. Watson, John D. Hartley, W. A. Newell, H. N. Kerman, R. W. King, A. Rothenstein, N. C. Barea, J. B. McMurray, A. McCasp and Louis Meyer.

DODGE PRINTING Co., Nov. 1. Capital stock, \$25,000. Directors—Z. U. Dodge, J. S. Dodge, H. Mosebach, R. B. McPherson, J. H. Pierce, C. Krass and W. F. Gibson.

BUILDING ASSOCIATION OF TURN VEREIN VORWAERTS, Nov. 1. Capital stock, \$50,000. Directors—F. Wienhol, F. C. Kauffuss, T. F. Obermeyer, M. Meyer, L. Thoenes, D. Salfeld and Gustav Liebold.

MINERAL KING M. & M. Co., Nov. 5. Location, Arizona. Capital stock, \$1,000,000. Directors—Albert Struckman, W. F. Perry, P. A. Wagner, J. W. Tripp and L. Grothwell.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Eureka Con., Nov. 3, \$27,000; Butte and Boston M. Co., 2, \$21,072; Con. California and Virginia, 3, \$102,000; Savage, 3, \$7000; Candelaria (Mexico) for S. ptember, \$116,000; Hanauer, Oct. 31, \$3900; Crescent, 31, \$14600; Hanauer, Nov. 1, \$2200; Germania, 2, \$1767; Hanauer, 2, \$2100; Crescent, 3, \$4700; Hanauer, 3, \$2400; Mt. Diablo, 1, \$7057; Mt. Diablo, 7, \$6997; Con. Cal. and Virginia, 7, \$84,300.

The California Traction Company.

Has, by a recently patented invention, solved the problem of the application of steam to ordinary wagon-roads. Road engines have heretofore been unwieldy and impracticable on account of the immense weight, size and power required, and the difficulty of steering. Under this patent only one-half the power, weight and size heretofore used is necessary to do the work. It makes the application of steam to wagon-roads not only practicable, but cheaper and more expeditious than horses. The Company is now prepared to furnish road locomotives or traction engines for the following purposes:

For hauling heavy loads over ordinary roads.

Steam motive power for suburban street-cars, with or without rails.

Swift motor with car for passenger traffic to be operated with or without track on ocean beach or country roads.

A combined steam harvester, after this principle, will be put on the market next season.

The principles of construction embodied are peculiar to these machines and involve an ease and economy of operation and simplicity and power heretofore unattainable in road engines.

Estimates of plants furnished where conditions of service are stated. Address Call Station, No. 209 Front St., San Francisco.

S. D. Ingram, President; T. D. Hoskins, Manager; A. E. Shattuck, Sec'y.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Oct. 13.	WEEK ENDING Oct. 25.	WEEK ENDING Nov. 1.	WEEK ENDING Nov. 8.
Alpha	2.55	3.30	3.05	3.85
Alta	1.55	1.90	1.85	2.30
Andes	1.00	1.25	1.20	1.40
Argentina	1.00	1.25	1.20	1.40
Belcher	4.95	6.30	6.25	9.00
Bodie	4.55	7.75	7.25	8.00
Bullion	1.45	1.75	1.70	3.01
Bulwer	1.35	50	40	75
Baltimore	1.25	1.50	1.45	1.50
Bodie Con	1.25	1.50	1.45	1.50
Benton	2.10	2.75	3.00	3.25
Bodie Tunnel	1.60	1.70	1.60	1.70
Bulwer	1.60	1.70	1.60	1.70
Challenge	5.75	7.50	6.50	8.00
Champion	2.85	4.00	4.00	3.65
Chollar	18	21	22	20
Confidence	1.70	1.65	1.70	1.65
Caledonia	40	40	55	60
Con. Pacific	4.70	6.25	6.25	8.25
Crown Point	1.80	1.85	1.80	1.85
Crocker	1.80	1.85	1.80	1.85
Dudley	1.80	1.85	1.80	1.85
East B. & B.	3.50	3.50	3.50	3.50
Eureka Con	1.35	1.70	1.60	1.85
Grand Prize	4.70	6.25	6.25	8.25

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING OCT. 31, 1888

392,999 — PIN-RAIL ATTACHMENT FOR SHIPS — Philip Brown, S. F.

392,114 — ELECTRICAL DISTRIBUTION — Geo. B. Fraley, S. F.

392,120 — PROSPECTING DREDGE — John Hatch, S. F.

391,991 — CANE AND STOOL — W. Leisner, Los Angeles, Cal.

392,049 — PRUNING SHEARS — C. Meyerholz, Santa Clara, Cal.

392,057 — TRAVELING THRASHER — Murray & Williams, Roseville, Cal.

5,725 — LAB-L — E. W. Joy Co., S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PIN-RAIL ATTACHMENT FOR SHIPS.—Philip Brown, S. F. No. 392,999. Dated Oct. 30, 1888. This is an adjustable helaying pin attachment for the pin-rails of vessels. It consists of a casting having a channel made in one side to fit upon the pin-rail, and vertical projections extending above and below the casting for the purpose of "helaying" or fastening a rope, and, in combination with this, of set screws by which the device is locked upon the rail at any desired point without reference to any holes or perforations within.

TRAVELING THRASHER.—Wm. H. Murray and G. O. Williams, Roseville, Placer county. No. 392,057. Dated Oct. 30, 1888. This improved thrashing machine is designed to travel about the field and receive the grain and straw directly from the header which travels independently by its side, said machine being adapted to thrash, clean and sack the grain at a single operation. In constructing their apparatus the inventors have employed what is known as the "Standard thrashing machine," having vibrating sections behind the thrashing cylinder, by the vibrations of which the straw and grain are carried backward and gradually separated from each other, so that the straw may escape at the rear of the machine and the grain be directed to the cleaning chute. The patent covers several improvements in detail. The main features are "in a thrashing and separating machine, the construction of the machine casing, the cylinder and concave, the straw-carrier, and the endless belt, the upper portion of which serves to feed the grain to the cylinder and the lower portion forms the top of the space over the straw-carrier and assists the travel of the straw over it."

APPARATUS FOR ELECTRICAL DISTRIBUTION.—George B. Fraley, S. F. No. 392,114. Dated Oct. 30, 1888. This invention relates to certain improvements in electric lighting and apparatus connected therewith, by the use of which the inventor is enabled to convert a continuous, direct, high-tension electric current into an alternating current at any point or points on the line, for the purpose of using the same for incandescent lights without diminishing or interfering with the high-tension current, or its use in the ordinary arc lights, or for other purposes. The dynamo may be of any of the well-known forms of construction for producing a continuous high-tension electric current, with wires for any length of current, and at any points within this circuit where it may be desired, the ordinary high tension arc light may be introduced and used. At any other points where it may be desired to use an alternating current for incandescent lighting, it is done by the introduction of a commutator and current reverser, and a converter through which the current is transmitted so as to produce the necessary secondary current for the use of the incandescent lights. The operation of the machine reverses the current through the converter, and as the commutator rotates, the alternate reversal of the current takes place backward and forward through the converter, and any number of changes or reversals per minute may be obtained by changing the speed of rotation of the commutator. By the peculiar construction and operation of this device, incandescent lighting may be effected from a series circuit, and the continuous high-tension current or currents may be converted into an alternating current or currents, this conversion taking place either at the station or anywhere along the line of the series circuit or circuits, and the incandescent lights can thus be operated at any distance away from the station and at any point within the circuit.

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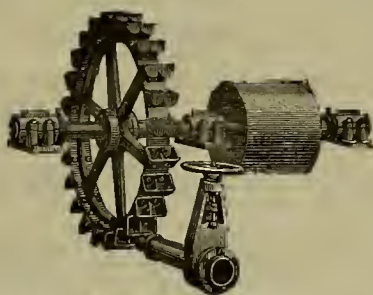
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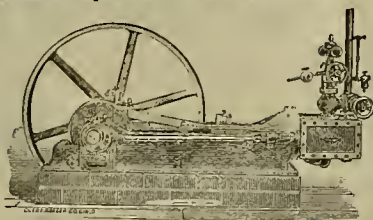
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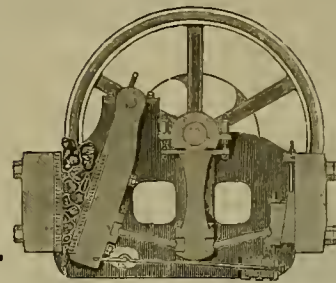
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goddard, Mining and Civil Engineer, formerly of the California State Geological Survey.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

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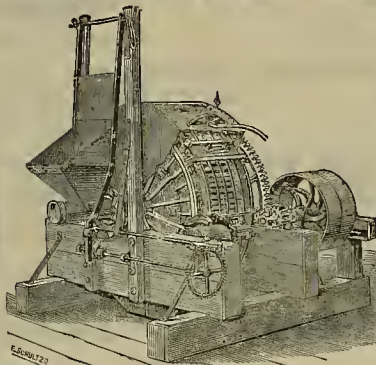
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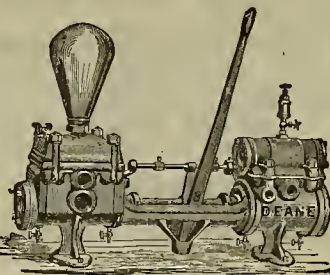
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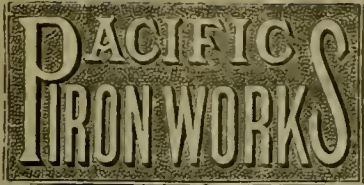
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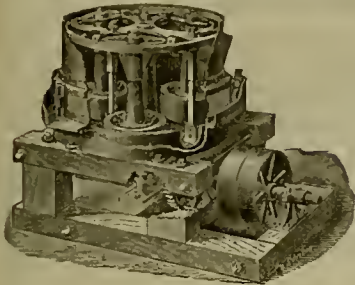
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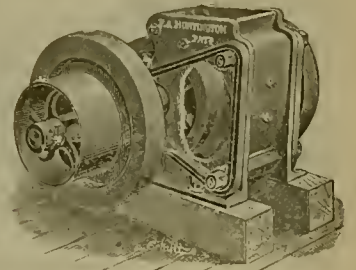
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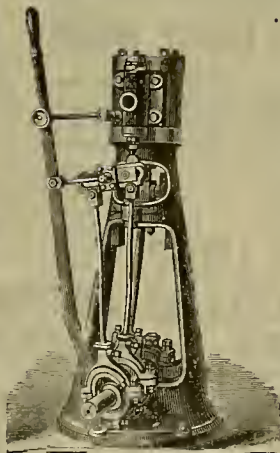
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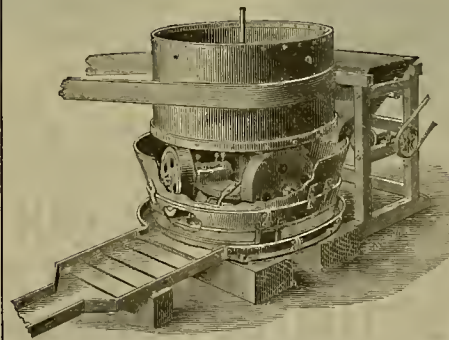
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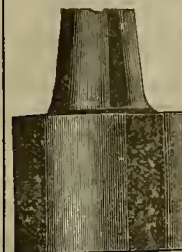
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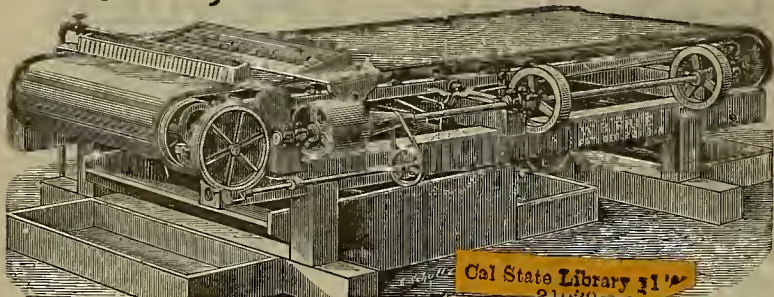
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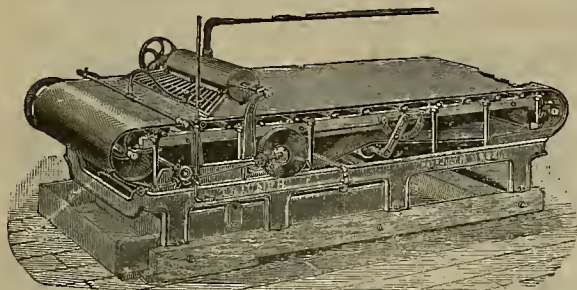
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

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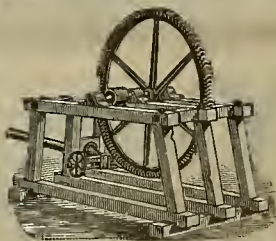
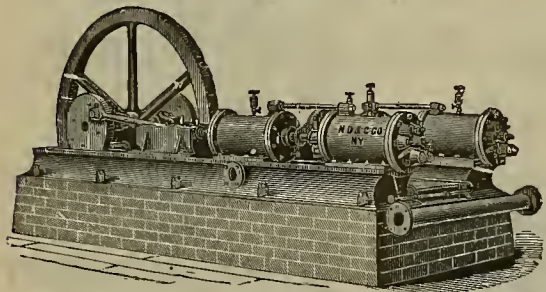
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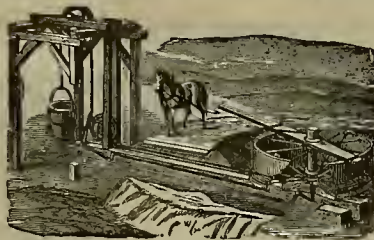
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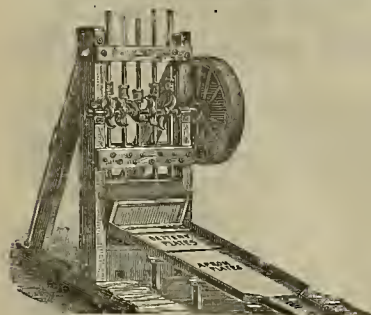
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SAN FRANCISCO, SATURDAY, NOVEMBER 17, 1888.

VOLUME LVI.
Number 20.

The Victor Concentrator.

The Victor Concentrator, which is illustrated on this page, was invented by S. W. Shaw of this city, and has been so modified and improved as the result of practical work in the past two years, that, having passed the experimental stage, it is now offered to the mining public. Its operation is unlike any other machine of its class, its motion being like that of the original of gold separators—the batea—worked by suitable mechanism so that the process of separation and concentration is automatic and complete.

The table is of concave disk-shape precisely like an enlarged batea. This rests on vibrating rods, and an eccentric and gearing give motion to it. To the edge of the table is a downwardly projecting lip or flange to prevent the water dripping off underneath on to the gearing.

A hole or opening is made in the center of the table, where is placed a small removable screen. Water comes from a stop-cock above down into the cup, and this supply is subject to regulation in proportion to the sulphurets in the ore.

The pulp to be concentrated passes from the batteries into the pan or receiver shown above the stirrers. This receiver is perforated, the holes being punched from above, so there are hurrns on the lower side in order that every stream falls separately on the table. This carries all the falling light stuff below the surface of the material already on the table. It becomes involved with the coarser sand and keeps on down to the bottom.

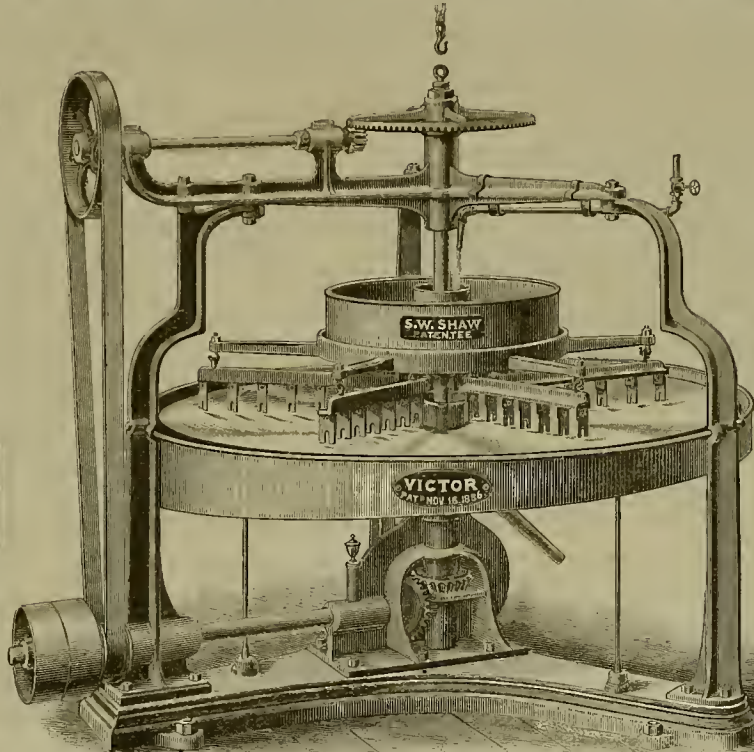
The batea-like motion imparted to the table causes the heavier portion of the material to come to the center, and the lighter substances—tailings—go off over the outer edge into the large encircling pan, and from there are discharged. Scrapers or rakes revolve slowly and aid in keeping the pulp loose so that the sulphurets can move freely to the bottom.

The concentrated sulphurets pass continuous-

moves from the top all the time instead of moving from the bottom.

As the table is given its vibrating or reciprocating motion, such as is given to a batea and

changed. This device is adapted to save amalgam, quicksilver, floured quicksilver, etc. The shipping weight is less than 1000 pounds. The machines are made to handle the pulp from a



THE VICTOR ORE CONCENTRATOR.

gold-pan, the pulp falls upon it near the center. The worthless portions such as sand and gangue are carried over the periphery of the table into the inclined annular trough, while the heavier

five-stamp battery. At the Gold Bank mine, at Forbestown, Butte county, there are four of these concentrators at work very successfully. The superintendent is very well pleased

Dredging for Gold in Rivers.

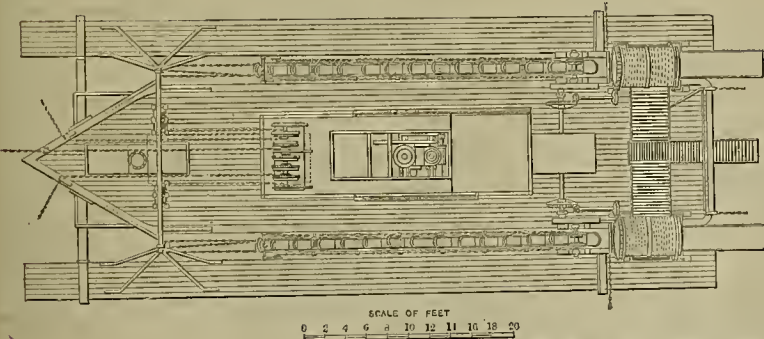
Although as yet we have never made any success of dredging for gold in the rivers of California, there are other parts of the world where they are making money at the business. On the Olutha, a large river on the south island of New Zealand, there are seven mining dredgers, all working successfully about eight months of the year. Mr. C. W. Rumble of Chicago has been looking up this subject of river mining with dredgers for the past year and a half, and came to California to experiment on the Feather river near Oroville. Seeing in the MINING AND SCIENTIFIC PRESS some account of work being done in the Australian Colonies, he went over there to personally examine the machinery. On his return here recently, he called on the editor of the PRESS, so as to give the benefit of his experience to its readers.

Mr. Rumble informs us that all the dredging machines which are working successfully on the Olutha river have chain buckets, and most of these are worked by the action of the current of the river on a wheel or wheels placed on the side of the scow. The river runs with a current of about 12 miles an hour. These water-propelled dredgers are run night and day, and work to a depth of about 20 feet.

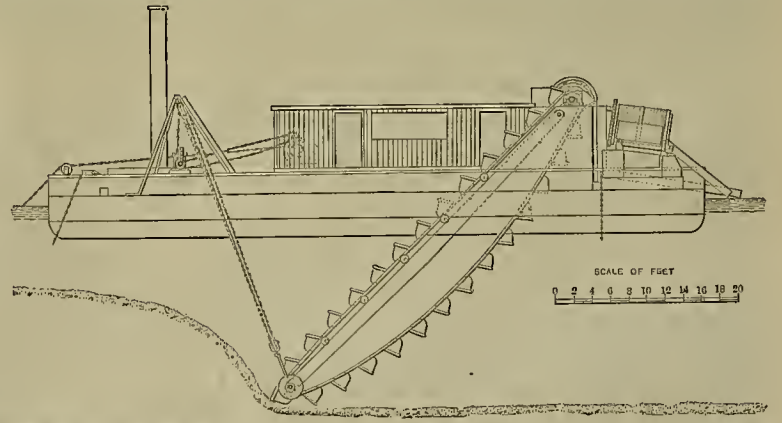
The machinery only requires the attention of one man on a shift, and they raise and wash about 15 to 20 tons of solid material an hour. All of these dredgers have been running for years steadily. One of these which has been at work constantly for eight years was being rebuilt when our informant was there. This itself shows the operations must have been successful. One of these dredges, of the same pattern except that it is operated by steam, is working at Alexandra, about 200 miles above the mouth of the Olutha. It has greater capacity than those run by water-power.

The dredged material falls into a sort of revolving grizzly to take out the stones and rock, and the earth and sand is washed in blanch-

Plan.



SCALE OF FEET
0 2 4 6 8 10 12 14 16 18 20



SCALE OF FEET
0 2 4 6 8 10 12 14 16 18 20

MACHINE FOR DREDGING RIVER BOTTOMS FOR GOLD.

ly in under the central shield or cup, fall through the screen over the central hole and are caught in a suitable receptacle. This screen is changed according to the percentage of materials, more perforations being needed where the sulphurets are abundant. The stream of water which comes in from above is also regulated at will.

The effect of spreading the pulp so widely is to almost destroy any current, and the pulp

and valuable ore or sulphurets by their greater specific gravity and the peculiar motion imparted to the table, will sink through the agitated and lighter particles of pulp, and work their way centerward to the small screen, and pass through it into a proper receptacle.

The upper receiving-pan, reels, etc., may be raised up to leave the whole top of the table clear, so that the central screen may be readily

with the results accomplished. N. W. Spaulding, 17 and 19 Fremont street, manufactures these concentrators. The machine gained a silver medal for its inventor at the recent Mechanics' Fair in this city.

KEELY, the "motor-man," has been found guilty of contempt of court in not obeying an order to open a sealed package said to contain a description of the Keely motor.

ket sluices, arranged on the scow, or "punt," as they call it in New Zealand. The huckets bring up rocks as large as a man's fist. If they strike large rocks or obstructions, they stop, because the motive-power is not enough to break them. The huckets of the ordinary dredges are about 12 inches deep and 12 inches wide, rounded at the corners. The scows draw about 12 to 15 inches of water. The general

(Continued on page 329.)

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Mines of Utah.

[Written for the Press.]

Utah is exceedingly rich in undeveloped resources. At the time of the early settlement of the country by the Mormons, nothing was known of the mineral deposits that are now being worked to such great advantage. The "latter-day saints" were then, as now, purely a pastoral people. Brigham Young considered it dangerous to Mormon institutions to permit his people to become infatuated with the less certain pursuit of mining after the fact was established that the country abounded in rich minerals. His policy was to keep it dark, "for," said he, "when the extent and richness of the mines become well known, the gentiles will flock here and possess the country." His idea was to develop the agricultural resources, claiming, with much propriety, that the mines would keep. Viewed from a Mormon standpoint, Brigham was correct in all particulars, but State or Territorial lines formed no barrier to the indomitable prospector who eventually found his way hither, demonstrating beyond peradventure the fact of the existence of immensely rich auriferous deposits which thereafter allured capitalists to commence the development of the same. Though extensive mining operations are of comparatively recent origin, they are already, it is asserted, a source of much greater income to the country than the pursuit of agriculture. And there are the best of reasons for believing that the mining industry will maintain its supremacy over that of every other for an indefinite period. A recent visit to some of the

Prominent Mining Districts

Of Utah by the writer furnished him satisfactory proof that the country provides a better field for the prospector and for the investment of capital than any other mining section of the great West. This conclusion was arrived at only after careful investigation. One thing that has retarded development has been the lack of capital. There is not the least doubt but that if the same prospects could be shown in California and elsewhere that are to be seen in Utah there would be an abundance of capital immediately forthcoming to open up and operate the mines. It is hard to account for the apathy manifested by capitalists with reference to the splendid opportunities offered in Utah; for, while it is true that some gigantic swindles have been perpetrated upon them by heartless mining sharps, there are a number of the best paying mining properties on the Pacific Slope; and I personally investigated mines in various stages of development, as well as some late discoveries (most of which are lying idle for want of capital to work them), that are known to prospect as well, if not better, than the famous Ontario mine at Park City. So much by way of an introduction. I will now endeavor to lay before your readers a few observations on the several mines of Brigham and Park City, the most thriving camps of the Territory.

For a small mine there is perhaps no better paying property in the Territory than the Nast mine, owned by Messrs. Watson, Stanchfield and Chandler, and superintended by C. W. Watson. Through the courtesy of Chas. Mayberry, foreman, accompanied by A. J. Stanchfield, I was shown through the mine. The entire force required to operate it is but 12 men, and the output is 90 tons per month. The assay value of the ore is 50 per cent lead, 25 ounces silver and from \$5 to \$8 gold per ton. Owing to a slight advance in lead recently, the owners realized 100 per cent on operating expenses for the month of September.

The Winnemuck M. & M. Co.'s mine is now working on the 300 foot level. The ore assays well. A two-foot ledge has been struck, which assays 41.60 per cent lead and 501.65 100 ounces silver. The company employs 30 men to operate it.

The Bingham Mining Company started up again the latter part of September with new machinery. The mill has five new Huntington pans and Hazelton boiler, and the capacity is 180 tons daily. The mill works 100 tons per day at present, with only four men. The manager, E. D. Egan, is willing to wager that the company has the largest body of low-grade ore on the Pacific Slope. The width of the ledge is over 200 feet and the depth has not been ascertained. The mine is but a few hundred feet west of the Nast and assays \$7 per ton gold. Mr. Egan is also superintendent of the Yosemite No. 2, which is now being operated on but half time because of the lack of water. I am indebted to J. T. Harrington, foreman, for courtesies during my visit. This is a very extensive and profitable mine, lead being traced for more than 4000 feet, and the average assay value of the ore is reckoned at 50 per cent lead, 10 ounces silver, and \$1 per ton gold. The company gives employment to 40 men around the mine.

The Brooklyn lead mine, formerly owned by a New York company, has, I believe, recently changed hands for a good figure. At the time of my visit 100 men were employed in and about the mine. There was over 30,000 tons of 30 per cent ore on the dump awaiting the erection of a concentrator. The daily output is 50 tons, 20 tons of which is first-class. The average

assay of the ore is 60 per cent lead and from 12 to 14 ounces silver. The work is superintended by R. G. Legg. The Jordan M. & M. Co.'s mine looks well. They have recently renewed operations. The marketable ore assays 50 per cent lead, 20 ounces silver and \$8 gold. The company are reconstructing their concentrator; \$2,500,000 worth of mineral has been taken from this mine up to present date.

Park City is noted for possessing one of the best mines, not only of Utah, but of the Pacific Coast—the Ontario mine having paid its owners in dividends since the year 1876 \$9,500,000. The Ontario Company employs 350 men in both the mill and mine. R. C. Chambers is the general superintendent. To Neal Gillis, foreman, I was indebted for favors during my visit to the mine. One feature in connection with the mine especially interested me, that is, the pumping machinery. Four pumps are in position, but only one is worked at the same time. The larger pump throws 360 gallons at a stroke, and makes $7\frac{1}{2}$ strokes per minute, or over 160,000 gallons an hour. The company have expended over a million dollars for machinery to operate the mine. The pumping apparatus is a necessity at present, and will be so until the drain tunnel is completed. The Ontario drain tunnel was recently started. Its length will be about three miles and it is calculated to drain the Ontario and Daly mines. Its exact cost cannot be ascertained, but it will doubtless cost several hundred thousand dollars. Thirty men will be employed to construct it—all that can be worked to advantage, and it is estimated that it will require three years to complete it.

The Ontario mill runs two rock-crushers and 40 stamps for ore and 10 for salt. From 12 to 20 per cent of the latter is used for roasting. It has 24 amalgam pans, 12 settlers and 6 retorts. The ore floor is 80x90 feet and 14 feet high. The engine is a 250-horse power.

The Daly mine is running steadily with an average output of 100 tons daily. The shaft is now 843 feet. The drain tunnel, connecting with the Ontario on the 600 foot level, is three-quarters of a mile long. The machine-shops are most complete, doing all the work necessary, except casting and constructing the heavy machinery. A six-foot Pelton wheel is used, and water-power is obtained from the Ontario mine. The mill is a 30 stamp, and employs on an average 60 men in its operation, crushing 80 tons per day. The milling ore assays from \$40 to \$50; the shipping, 20 per cent lead and 100 ounces silver. The wages paid by the company for 12 hours range from \$2.50 to \$4. A new building has just been constructed for leaching.

The Massachusetts mine, originally known as the Empire, is now doing development work and has just reached the 600-foot level, and has commenced to drift, but is shipping no ore as yet.

The Anchor Mining Company owns more ground than the Ontario. A tunnel is in course of construction, which, when completed, will be over $1\frac{1}{2}$ miles in length. It is expected to have it finished by March next. I was informed by John McSorley, who has the important work in charge, that as high as 117 feet was made in a single week. At the altitude of the mine, about 8000 feet, snow sometimes falls to considerable depth, and the consequent snow-slides are often a serious hindrance to mining operations here. The men had a narrow escape from a slide last winter. The hoarding house was without a moment's warning entirely overwhelmed, several of the boys barely getting away with their lives. The tunnel has now reached about 5000 feet.

The most lofty mine in the Park City district is the Crescent, five miles from town. Its altitude is 9500 feet and it is reached by a tramway which cost the company \$45,000, built four years ago. The ascent from the town is about 500 feet per mile. All the ore is shipped down the tramway to the concentrator located at the depot, thence, when through with operation, to Omaha. The average assay of the ore is 30 ounces in silver.

The Disappointment, owned by Messrs. Duffy, Richardson & Hirschman, is located just west of the Crescent. Two shafts 90 feet each have already been sunk, and a tunnel 500 feet has been made. Ore is now being taken out which assays 60 per cent in silver and lead, and \$7 in gold. The proprietors recently took out 14 tons from one lead in a week and realized from the same the snug sum of \$700. The Gem, an adjoining claim, together with the Disappointment, have been bonded for \$18,000.

The Creole mine, adjoining town on the west, was patented by the proprietors, Messrs. Condon & Moore, in '82. Tunnel to cut ledge is 190 feet. Cut the ledge at 158 feet. Drifted on the ledge 140 feet and made three upraises, finding ore all the way. Seven hundred and fifty feet east from Discovery the ore is continuous. There is a five-foot body of ore at the incline shaft. All prospecting or deadwork is now completed, thousands of tons of second-class ore being in sight. The proprietors some time ago shipped 200 tons of ore, which yielded 20 ounces silver, 30 per cent lead and \$4.50 in gold. The location of this mine is one of the most convenient in the camp, and it is well provided with timber growing on the premises. It is the prediction that, had the owners of this mine the available capital to push the work forward, it would hold rank with some of the better mines of the camp. It certainly is worthy the investigation of capitalists seeking profitable investment.

The West Ontario, known as the Farrish and McLaughlin group, located 400 feet west of the

end lines of the Daly mine, has an excellent name in the camp. From rock taken on the 200-foot level, an assay placed the value at \$260 per ton, and the vein proper is three feet solid ore. The mine embraces three lengths and enough space in breadth to make up the 20 patented claims comprising the group. The owners so far have done little except development work, but expect to push ahead with a good force soon. They use a whim horse, and so far have brought their ore to Park City sampling-mills. It is claimed that the mine promises as well as the best ever did in Park City at present stage of development. It can hardly be denied that there is something in luck, especially when it comes to mining. Such reflections are forced upon us when the history of the Woodside mine of Park City is reviewed. The owner, E. P. Ferry, has for some years been in the habit of leasing the mine out, and for a time it was on the list of the condemned. A large sum had been expended in its development, but without commensurate success. Finally, during the latter part of September last, two miners, Drake and Williams, happened to be passing over the claim, and sat down to rest. They began carelessly examining some croppings. To their astonishment, the float proved very rich, as they were qualified to determine, whereupon they proceeded at once to secure a lease and commenced the work of development. The ore pays handsomely from the surface, thus enabling the proprietors to employ all the men that can be worked to advantage, and pay them from the immediate proceeds of the mine. The ore assays 50 per cent lead, 50 ounces silver and about \$2.50 gold. These worthy miners certainly have a bonanza. F. B. L.

The Lixiviation of Silver Ores with Hyposulphite Solutions.

EDITORS PRESS:—C. A. Stetefeldt, M. E., has written and published a book with the above title, which professes to be an exposition of the theory and practice of silver leaching. The practical part consists of a digest of Russell's experiments and a compilation from Daggett's practical pamphlet on the Russell process. The theoretical portion is partly compiled from various chemical books and partly original. It is with the latter portion that I propose to deal in this article. As the author has not spared Daggett in the matter of some unimportant chemical errors in that gentleman's excellent paper, which does not claim to be scientific, he cannot complain if his own statements are made the subject of criticism. He claims that the chemistry of leaching silver ores now rests on a sound basis (*sic*). If he will say a basis of sound, I will agree.

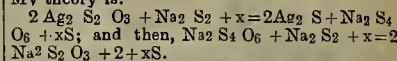
In one of the author's earlier papers on the Russell process, he advanced a theory of the precipitation of silver by a polysulphide from a hypo solution, which I could by no means accept as true. This theory called for the formation of sodium sulphate, whereas no sodium sulphate is produced in the reaction, as I have proved. I investigated the subject by experiment, and came to the conclusion that the reaction produces sodium polythionate, almost certainly tetrathionate, and that, reacting secondarily on sodium polysulphide, reproduces the hypo. This was fully set forth in two articles which appeared in the *Eng. and Mining Journal* of Nov. 19th and 26th, 1885.

Nevertheless, perhaps rather the more, Mr. Stetefeldt reaffirms his absurd theory in his new book, not noticing my articles, unless the following discourteous, not to say insolent, passage from page 79 is to be considered as referring thereto: "An obscure critic has taken me to task for advancing this theory in my first paper on the Russell process, because, he says, not a trace of sulphuretted hydrogen is evolved in the reaction. Evidently his classical education is at fault in not comprehending the meaning of 'in statu nascendi.'"

It is true I did not make the above statement; my argument was based on much wider grounds and deeper withal, but I am the only one who publicly challenged his views. I did not take him to task. I simply showed that his theory was wrong and offered a better one, which explains all of the facts observed in practice, of some of which Mr. Stetefeldt was evidently ignorant. It also accounts for all of the phenomena developed in the laboratory in this connection, including Russell's high coefficients of precipitation and his low ones, the free sulphur in the precipitate, even though pure Na_2S_2 he used as precipitant, and the very significant fact that if a solution of silver in hypo is treated with successive portions of a polysulphide solution, the precipitate being collected and determined for each, it is found that the coefficient of precipitation diminishes progressively, due to the relatively increasing effect of the tetrathionate in consuming the sulphide as the proportion of metal becomes less in the liquid; and that other significant fact, noticed in practical work long before, but not then understood, that after all silver or other metal is down the liquid can still decompose a considerable quantity of the polysulphide, which is due to residual tetrathionate.

On page 78 the author has discussed (without credit) the first half of my theory, that which explains a high coefficient of precipitation and the production of tetrathionate, and rejects it on grounds which a consideration of the secondary reaction, the decomposition of the tetra-

thionate of polysulphide, completely invalidates. My theory is:



Though the second equation, as a fact *per se*, was known to some chemists before, the first is mine, as is also the complete theory. It must, therefore, he supposed that Mr. Stetefeldt, while lacking candor to acknowledge it, derived the idea of the first equation from my article. But at that time the author did not believe in the reaction expressed by the second equation, and did not even take the trouble to test it, as he could easily have done; hence he occupies the false position of having examined and criticised the half of a chemical proposition. Is this scientific? He believes in that reaction now, however, having dug it up in Graham's Chemistry; but his previous willful ignorance has resulted in the falsification of a large part of his theory of leaching, as set forth in this book.

It is not, however, that Mr. Stetefeldt has yet come over to my view as to the theory of precipitation; that he must do so I have little doubt, but as he will not be able to dig that out of any book, nor probably willing to accept instruction from so obscure a person as myself, we must give him time for "rediscovery by scientific research," as he has himself told us he rediscovered a fact which had been known to every Mexican *azoguero* over a hundred years before, and was also known to most "muscular amalgamators," the scientific research in that instance consisting in some experiments in something like a frying-pan or other domestic utensil.

But he has admitted, in a recent supplement to his book, that the tetrathionate formed in making extra solution is regenerated in the precipitating-tanks, and therefore that his assertion, on page 136, that any such assumption is "absolutely false," must be retracted, and that his naive wonder at the small loss of sodium thiosulphate at the Yedras mill, where they use ten pounds of bluestone to the ton of ore for making extra solution, and therefore ought to lose, at least, as much thiosulphate, according to the book, was foolishness. Verily, pride goeth before a fall! Mr. Stetefeldt might have learned all that and more from my articles, but he would not. This timely retraction forestalls an article which I had prepared on the point; unfortunately, it did not come in time to forestall a set of experiments which I made to prove that I was right.

To return to the author's theory of precipitation, his equation calls for not only sodium sulphate, which is not formed, but also for the production of sulphur dioxide. Now, almost any chemist knows that sulphur dioxide, in presence of aqueous polysulphide, forms thiosulphate; but this expounder, finding or alleging an approximate agreement between Russell's experimental coefficient of precipitation and his own equation, neglecting the sulphur dioxide, first cites the alleged fact in support of his theory (up to the point at which the effect of SO_2 claims consideration), and then, finding that the effect of the SO_2 would reduce his coefficient so much as to destroy that agreement, again cites the fact to prove that SO_2 does not react as it *must* do if present. I suggest, though assured that no suggestion of mine will be accepted by this self-sufficient author, even though it were the purest truth that ever gemmed the crown of science, that he adopt the view, quite usual among chemists, that SO_2 , in presence of water, forms H_2SO_3 . This will give him a chance to dispose of the inconvenient SO_2 with formation of H_2S , thus: $\text{H}_2\text{SO}_3 + \text{Na}_2\text{S}_2 = \text{Na}_2\text{S}_2\text{O}_3 + \text{H}_2\text{S}$, the latter, *in statu nascendi*, precipitating silver. This, if not true, is as true as his theory, and good enough to finish it out with.

Russell has found that the presence of caustic soda in the hypo is injurious. Ores containing calcite are liable to contain caustic lime after the roasting, and this reacts on the hypo, forming caustic soda. On pages 163-4 the author says, referring to this matter: "But if the extra solution is applied at once, the cuprous hyposulphite neutralizes and counteracts the deleterious effects of the caustic lime." Now caustic lime could only precipitate cuprous oxide from extra solution, but cuprous oxide is soluble in the hypo, and if precipitated for the moment by the lime in temporary excess, must be redissolved almost instantly. Can it be dissolved without rendering the hypo caustic? I say not, and the author's theory of this application of extra solution seems unsound. That the practice may also be unsound is suggested by the fact that, "before the extra solution follows the first wash-water, it has been found beneficial to impregnate the (alkaline) ore with a small quantity of a strong copper sulphate solution." In this case, the caustic lime precipitates cupric hydroxide which is not soluble in hypo, hence the desired result is attained.

On page 79 is the following statement: "The sulphuretted hydrogen evolved in precipitating polysulphides on the large scale, is principally due to the presence of acid salts in the lixiviation solution." This must, in candor or in charity, be understood to mean, after the metals are all precipitated, and in case an excess of polysulphide is used, else it would be simply stupid. But what acid salts can be present after the washing of the ore, and after addition of the precipitants? Daggett says something about H_2S being evolved when an excess of polysulphide is used, but that must be due to spontaneous decomposition of the excess, not to acid salts. I am not afraid to indorse the statement

attributed to "Obscure Critic," that "not a trace of H_2S is evolved in the reaction," for, even though acid sulphites, or free SO_2 may be present in the solution of sulphuric acid, has been added to the hypo, yet these will not cause evolution of H_2S because, as the author himself insists, that substances would precipitate silver in *statu nascendi*, it produced during the operation, but it would not even be produced by acid sulphites.

On page 39, article on decomposition of an acid extra solution, the author says, "After sufficiently long exposure to the atmosphere, the free acid becomes neutralized by Cu (H O)₂," meaning free sulphuric acid, as shown by the context. Granting that a very small quantity of free sulphuric acid may exist in a hypo without decomposing that, whence comes the cupric hydroxide, if, as the author has previously said, "The oxygen absorbed by the cuprous salt is all transferred to the sodium hypsulphite," "so long as free acid is present?"

I understand the meaning to be this: The cuprous salt oxidizes and forms cupric sulphate with the free sulphuric acid; cupric sulphate reacts on sodium thiosulphate, producing sodium tetrathionate and sulphate, and reproducing cuprous thiosulphate, and so the deterioration in hypo progresses without loss of cuprous thiosulphate; but when all of the sulphuric acid has thus been combined to form sodium sulphate, the same reactions go on as in a neutral solution. The meaning may be correct, but the expression is worse than "obscure." But can free sulphuric acid exist in presence of sodium thiosulphate and of the same salt of copper? I think it is very doubtful, for it would seem that the sulphuric acid should at once form sodium sulphate. The argument against this is the non-appearance of free sulphur. May it not be that thiosulphuric acid, though it has never been isolated, may exist in small quantity in the solution without immediate decomposition? This point I cannot decide, and it may be that it is not so; and the reaction may take a shorter course than that I have indicated, leading to the same result, however; my concern is only with the muddled method of the text at present.

On page 44, discussing the use of cuprous chloride for making the extra solution without destruction of sodium thiosulphate, ignorance of the reaction by which that salt is reproduced again appears, and the following peculiar statement occurs: "The extra expense of preparing cuprous chloride would not compensate for the saving in sodium hypsulphite." What is probably meant is, that the extra expense would not be compensated by the saving. This would not be worth notice but that the author, by implication in the obscure critic, prides himself on his classical education, and ought therefore to write good English. The author has suggested, on page 45, that, on account of the fact that each pound of bluestones used in making extra solution destroys a pound of sodium thiosulphate, it might be a good plan, where freight is high, to ship 100 pounds of the ready-made Leuz salt in place of 279 pounds of chemicals for making it at the mill (I believe there is an error in the figures, but have not time to look into that) a very good scheme, which he abandons in a recent supplement on account of his error as to the effect of tetrathionate, forgetting, apparently, that the regeneration of thiosulphate is at the expense of polysulphide.

The remark with which the paragraph concludes, that besides a great saving in freight this stock solution would not be overloaded with foreign salts, remains good, notwithstanding the late discovery. The tetrathionate remains a foreign salt until it has accumulated in the hypo sufficiently to take part in the decomposition of the sulphide, that is a very considerable part, because of the stronger affinity of the metals, as explained in my article of 1885. Then there is the sodium sulphate, also a foreign salt, which is never decomposed. It seems as though Mr. Stetefeldt in his haste to retract an error has perhaps gone too far in condemning his own suggestion.

I could say more, but I have said enough for this occasion. I think the Russell process is a brilliant discovery, and hope Mr. Stetefeldt may shine in its light to his heart's content. Barring the errors in theory, his book is a useful one, though abounding also in numerical errors which are discreditable to either the author or the publisher. But two fatal blunders so pervade and undetermine the ostensibly scientific part that it will never be presentable in a scientific point of view, notwithstanding the patchwork of supplements, until carefully rewritten. Perhaps it would be a good idea for the author to sit down quietly and prepare a new edition for presentation to the purchasers of this, with caution as to despising the intimations of obscure critics.

I will conclude with the remark that a book of this character is not embellished by sneering remarks about the opinions or practice of workers, several of whom are scored by name in the book, nor by insulting, anonymous allusions, of which I note more than one. Criticism which is worth any notice, however obscure its source, sneers not candid and truthful, even if caustic, discussion.

C. H. AARON.

THE land to which Indians are contesting Richard's Gird's title in Southern California is not, as reported, a part of the Chino ranch, the title to which is not questioned.

THE business men of Tacoma, Wash., have organized a relief society to provide support for the indigent during the winter.

California.

Origin of the Name.

[Written for the PRESS by HENRY G. HANKE.]

It is now generally admitted that the name California was derived from a popular romance published in Madrid in the year 1521. It was entitled "Las Sergas del muy esforzado Caballero Esplandian Hijo del Excelente Rey Amadis de Gaula;" in English, "The Exploits of Very Valiant Knight Esplandian, Son of the Excellent King Amadis of Gaul." Chapter 157, containing that portion describing the golden island of California, was published in the original Spanish with English translation, in the Sixth Annual Report of the State Mineralogist of California, folio 8.

Assuming that the supposed golden land was named from the mythical island of the romance of Las Sergas, there may still be a more ancient though indirect origin of the word California.

It may be asked, "Did the word originate with the author, or did he take it from the works of some still older writer?" The latter surmise seems the most likely, and it has been suggested that the name came indirectly from Julius Caesar's wife Calpurnia. In looking up this subject, it is interesting to note that similar names were very common in Roman and Grecian history, not only as individuals, but as families, extending through long periods of time, and it would appear likely that the author of the Spanish romance may have had some of them in mind while writing it.

Calliphon was a renowned painter of Samos, referred to by Pliny.

Calliphon fills a place in history as a well-known dancing master.

Calphurnius, J., was a Greek scholar of the fifth century.

The family Calpurnia were noted office-holders in Rome, and it is related that before the death of Emperor Augustus, 11 of them had been made Consul, while others, in consideration of their war victories, had been honored with triumphs.

Lucius Calphurnius, a Tribune of 149 B. C., gave his valorous son a golden crown weighing 20 pounds.

Calphurnius Titus was a native of Sicily, but little is known of his life except that he was a poet who imitated Virgil. The exact date of his life is not known, but is believed to have been in the reign of Gordon III, about 288. He wrote 11 celebrated eclogues, which were first printed in 1471, 50 years before Las Sergas appeared.

Calpurnia, spelled also Calpurnia, was the daughter of L. Pius of a renowned family of Rome, and a branch of the Calphurnians descended from Calphurn, son of Numa Pompilius, second king of Rome. She was Caesar's fourth wife. During the night before the assassination she dreamed the roof had fallen, and that he had been stabbed in her arms. She used her best effort to prevent his leaving the house.

A celebrated law—Calphurnia Lex—was enacted A. U. C. 604. Its object was to punish severely those who gave or received bribes.

Either of these names, so well known in history, may have suggested that given by the author of Las Sergas to the Golden Island and its Queen.

There is a circumstance connected with the early history of California, not generally known, that may be interesting to your readers. As far as we can learn, Captain Melchior Diaz was the first European to set foot on the territory now known as California, and to enter what is now known as San Diego county, where he met with an accident which terminated his life. The events leading to this tragedy were as follows:

Cortez discovered Lower California in 1533, and two years later (1535) examined the coast in person.

In 1539 Vasquez Coronado, Governor of New Galicia, departed for Culiacan in company with three Franciscan Friars. He sent his companions with a negro, Stephen, on a journey of discovery, with orders, if possible, to visit the seven cities of Cibola. The command of this small expedition was given to Marcos de Niza. They penetrated the desert and reached the cities of which they were in search, but the negro, with great arrogance, not only demanded the putative gold, but the women also, upon which the inhabitants killed him, sent back part of his companions, but retained several of the young men as captives. The monks, who had remained at some distance from the town, on learning the result, returned immediately to Culiacan and reported the unfortunate termination of the expedition to Coronado. They also described the country as being rich in gold and well worthy of conquest. Coronado returned to Mexico and caused an excitement, which ultimately led to his famous march.

In April, 1540, a great expedition departed from Culiacan, led by Coronado. At Chiametta he met Captains Melchior Diaz and Saldihar, who, with a small party of mounted men, had explored the desert country as far as Chicilticale (Casa Grande, on the Gila river). The account they gave to Coronado was so discouraging that he was about to abandon the expedition and return to Mexico. The army, however, gaining confidence, continued on, and finally reached the Colorado river, which they named "Vermijo," from the deep red color of its waters. Soon after they arrived at Cibola,

probably the Zuni villages, and were greatly disappointed on finding no gold or anything else of value.

On the 9th day of May, 1540, an expedition by sea, under command of Fernando Aleron, sailed from Natividad in two ships, the St. Peter and the Santa Catherine, to support Coronado and to furnish supplies for his army. The commander had orders to sail along the coast and to be within signal distance of the land. Lower California was then supposed to be an island and the Gulf of California a strait, and it was taken for granted that ships could sail without difficulty for any distance up the coast.

Aleron's ships put into Compostela and Culiacan to learn that Coronado had continued his march beyond. Sailing northward, he found the shores to approach, and finally join, revealing the fact, then first known, that Lower California was a peninsula and not an island. This discovery was forgotten for many years, and California mapped as an island, and called Islas Carolinas, until its connection with the main land was rediscovered by Father Kuhn, 160 years later.

At the foot of the gulf Aleron discovered the Colorado river, which he named "Rio Buena Guja," and on the 26th day of August, 1540, commenced an exploration in two small boats, which he was compelled to haul up with ropes, owing to the force of the current. Not being able to communicate with Coronado, he returned to his ships. On the 14th day of September he renewed the attempt, and reached a point 85 leagues from the mouth, some miles above the present site of Yuma in Arizona; returning to the mouth of the Gila river, he erected a cross, at the foot of which he buried letters for Coronado.

Captain Melchior Diaz led an exploring party of well-mounted men from Sonora. Hoping to meet the vessels on the coast, he traveled northward 450 miles, and also discovered the Colorado river, which he named "Rio del Tizon," from its muddy or dirty appearance. From the Indians, who were generally hostile, he learned that the Spanish boats had been up the river, and, going to the locality given by them, found the cross and letters, which informed him that Aleron, finding that he could not sail farther north in the gulf, had returned to New Spain. Diaz crossed the Colorado river on rafts and continued his explorations into the Colorado desert. As far as the writer can learn, this was the first party of Europeans that ever entered our California. The Spaniards did not penetrate far. Diaz was accidentally killed by falling on his spear, whereupon his command returned to Sonora.

In view of these facts it would be appropriate to name some prominent mountain, lake or county after that bold Spanish explorer and first California prospector.

Idaho Findings.

EDITORS PRESS:—Silver City in Owyhee county, Idaho, is quite elated over some rich strikes lately made in the Poorman, Oro Fino and Owyhee, on War Eagle mountain. The Oro Fino Limited is an English company, and is working a large force. Their mill is being enlarged to a 30-stamp capacity. They have lately run into a large body of ore, the pay streak being about three feet wide. An English company has lately bought the Poorman group of mines, and is cleaning out the Belle Peck tunnel. One million dollars was taken out of the Poorman proper in one month, and it is estimated that this mine has given up six million dollars all told, since its discovery. The Illinois Central, adjoining the Poorman, is being worked and is producing rich ore. The Owyhee, owned by the Shawmut Co. of Boston is showing up handsomely; some extremely rich ore was run into last week, the pay vein being about 2½ feet in width, with plenty in sight. This recent strike was made on the seventh level, about 400 feet from the surface. In each of the above-mentioned strikes it has been in comparatively virgin ground, very little exploration work having been done for some time, and it was gratifying indeed that the work of prospecting in new ground should prove so successful.

On Florida mountain, the Black Jack mine is working a large force of men. In the past this mine has produced about half a million. Phillips & Sullivan are taking out very rich ore. About 200 tons from the Seventy-Nines mine is being crushed and is "way up." The Wilson mine of Waggon town is running through their mill a lot of about 700 tons. All this ore has been taken from development work. They have immense reserves, and this mine will prove one of the richest in the country. The future output will prove astounding.

The Warren mining district, situated 150 miles northeast of Weiser on the Oregon Short Line) is an old placer-mining district, and was once very rich. About 20 years ago a great many locations were made, but, owing to the then costly modes of reducing ore, they were abandoned, but they have since been relocated and some new discoveries made. Some are all gold, and the rest gold and silver. The ledges are small, but high grade, varying from eight inches to two feet. There are two mills in the district.

The Seven Devils country has undoubtedly the largest copper deposits in the United States. To give an illustration, some of the ledges are said to be 150 feet wide; 200 tons have just

been shipped to Chicago from the Blue Jacket mine. This mine is exceptionally rich. Next spring great activity will doubtless prevail in this district and one adjoining, which is said to be rich in gold ore.

The Mineral district is showing up well. Considerable prospecting and assessment work are being done there. J. L. DOYLE.

From the Yukon.

From now on we may expect the continuous arrival of parties from the Yukon until winter closes up the trail. From what we can learn of the past season's mining in that section, active washing has been almost exclusively confined to the bars on Forty Mile creek, and about the same results as were obtained last season. In the main the bars paid from \$5 to \$25 per day per man, using the most primitive methods for washing—the rocker. As is the case in every mining camp, some of the miners have made moosey, and others nothing. Washing commenced there last spring earlier than usual, the miners cutting through the ice to get to the gravel, which was thawed out and washed, and by this means some of the claims paid well. The ice in Forty Mile broke up from the 12th to the middle of May, after which raining on the stream became general. On account of heavy rains during the first of the season, which caused high water in the stream, washing was confined to the upper bars, which are not as rich as those lower down on the river; but during the latter part of the season, as fast as the waters went down, the miners commenced washing on the low bars, and considerable dust was taken out.

An excitement was raised about 400 miles below the mouth of Forty Mile, on Beaver creek, which caused a stampede to that locality early last spring, but late reports from there are not very encouraging; however, but little is yet known as to what the miners have accomplished there. The probabilities are the miners who went down there will return by way of the mouth of the Yukon.

At no time during last winter and spring were provisions scarce, and prices of such anything but exorbitant, the staple articles being rated as follows: Flour, \$15 to \$17.50; bacon, 40c; sugar, 30c; beans, 20c; butter, 75c; oatmeal, 30c. So far as known only three deaths occurred there last winter—Welch, in January, Mastic, of scurvy, in February, and Anthony Holmes, in February. The miners enjoyed good health, with the exception of slight attacks of scurvy. The winter was the mildest known for years, and in January, the coldest month, the thermometer only indicated 55° below. About 160 men wintered on Forty Mile; others wintered below and some above. About 125 men are now mining on Stewart river, where, in the past, some very rich bars have been worked. The result of this season's mining on that stream is not yet known.—*Alaska Free Press.*

ELECTRIC LIGHT CARBONS.—"Where are all the carbons made that are burned daily in the electric lights in use throughout the United States?" asked a *Mail and Express* reporter of the president of one of the leading light companies in this country the other day. "Two-thirds of them," he replied, "are manufactured in Cleveland, Ohio. There are, according to the latest statistics, about 150 tons in daily consumption, and out of that number a shade over 100 tons are turned out in the 20 carbon furnaces in Cleveland. The capacity of an ordinary furnace is about 45,000 carbons, but some of the manufacturers are now running over-time, so great has the demand grown. Six years ago all the carbons burned throughout the country were made in a single room in Boston, where only ten men were employed. Carbons are made chiefly from the residuum of oil after it has been refined, and the deposit usually found around the natural-gas well is also coming into general use, as it does not sputter when made into carbons. The material is first ground into a powder, when a little pitch is added, and the whole mixed into a stiff batter, when it is run into molds. These are then packed into boxes and the latter placed in a furnace, where they are subjected to intense heat. Carbons are now sold at \$27 a thousand, with the prospect of an early increase in price."—*N. Y. Mail and Express.*

RAMIE.—Two years ago the Newhall Land and Farming Co. secured about a carload of ramie plants and set them out on 2½ acres just above Newhall. The plants flourished, and on Wednesday last a half-carload of cuttings were shipped to San Francisco to be worked up. Ramie grows from rooted cuttings, and is very hardy. They are set out about 18 inches apart. The first year's stalk shoots up about three feet, and continues to increase in quantity year by year until it gains a growth of 8 and 9 feet. When the plant has got its growth the stalks are cut off and allowed to dry until the leaves wither off, and they are then ready to be treated. The portion left standing rots to the ground and a new stool shoots out in the spring. The cost of planting is quite small; it requires comparatively little attention and lives for years. The work of harvesting is inconsiderable—in fact its production costs less than most anything else—and we are credibly informed that the yield returns from \$200 to \$600 an acre.



A. T. DEWEY. W. B. EWER.

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO

Saturday Morning, Nov. 17, 1888.

TABLE OF CONTENTS.

EDITORIALS.—The Victor Concentrator; Dredging
for Gold in Rivers, 325. Passing Events; Chrome
Iron Ore; Foundry Notes; The Colliery Disaster; Port-
land Manufacturing Establishment; California Iron;
The Debris Investigation, 328. Manufacture of Sul-
phuric Acid, 329.

ILLUSTRATIONS.—The Victor Ore Concentrator;
Machine for Dredging River Bottoms for Gold, 325.
Iron Sulphuric Acid Still, 329.

CORRESPONDENCE.—The Mines of Utah; The
Lixivation of Silver Ores with Hyposulphite Solu-
tions, 326. California, 327. Idaho Jottings, 327.

MISCELLANEOUS.—From the Yukon, 327.

MECHANICAL PROGRESS.—The Iron Supply
of the World; The Manufacture of Portland Cement;
Butter and Nails; Aluminum Steel; Chemical vs. Me-
chanical Tests; A New Telegraph Wire; Improved
Railway Stations; Accidental Alloys; To Temper Steel
on One Edge, 330.

SCIENTIFIC PROGRESS.—Heat from Elec-
tricity; Electrical Production of Diamonds; Air in
Water; Condensed Literature; A Remarkable Tele-
phone; The Human Step, 330.

USEFUL INFORMATION.—Twenty-four Gram-
matical Readings of the Same Line; The Great Leaky
Log Ratt; A New Hushing Machine; Mr. Edison's Baby
and His Phonograph; The Burning Glass Again; Clean-
ing Clothes Properly; A New Use for Sugar; To Have
Callas Bloom Successfully; Cider Making; Another
Mammoth Grapevine, 331.

GOOD HEALTH.—Nervous Phenomena; Why Men
Should Not Shave; Electricity for Writers' Cramp;
The Tomato in Bright's Disease; Grapes as Food;
Beautiful Heroism; Remarkable Endurance by a
Child; The Electric Light on Health; Hot Water for
Ivy Poisoning; Effect of Cocaine and Morphine, 331.

MINING SUMMARY.—From the various counties
of California, Nevada, Arizona, Colorado, Idaho, Mon-
tana, New Mexico, Oregon, Utah, Wyoming, 332-33.

MINING STOCK MARKET.—Sales at the San
Francisco Stock Board. Notices of Meetings, Assess-
ments, Dividends, and Bullion Shipments, 333.

Business Announcements.

[NEW THIS ISSUE.]

Assessment Notice—William Penn M. & M. Co.
Assessment Notice—Lord of Lorn G. & S. M. Co.
Notice—The Buffalo Con. M. Co.
Notice—The California Con. G. M. Co.

See Advertising Columns.

Passing Events.

The first rain of the season commenced fall-
ing on Thursday, and there will now be no
scarcity of water for mining purposes for many
months. The farmers, too, will rejoice at the
advent of the rain.

There seems to be a general tendency all over
the coast to put up concentrating works, and
many new ones are being erected and planned.
Years ago this step was urgently advocated by
the PRESS as one which would much more rap-
idly advance the mining industry.

There is some discussion at present over the
subject of contractors here sending East and
abroad for machinery and castings instead of
having them made at home. The competition
mainly felt here is that of Chicago foundrymen,
as they have cheap coal and iron and compara-
tively low wages in their favor.

The Governor of the State is building a rail-
road in San Diego county as an accessory to the
development of iron ore deposits in that region,
and fully expects to establish a profitable enter-
prise.

THE Vanconver (B. C.) World says: It is
rumored that Mayor Stewart of Ottawa has
sold the Banff coal mine to an English syndi-
cate for £1,000,000.

Chrome Iron Ore.

No chrome iron ore is produced in the United
States except in California (the Maryland beds
being exhausted), and here it is found in a great
many counties. The traffic has for years
amounted in this State to from 3000 to 5000 tons
a year. The ore has to be carried to be
manufactured to Baltimore, Philadelphia or
Boston, where good coal is cheap, and its prod-
ucts find a ready market.

The value of chrome iron ore in New York, of
a commercial standard of 50 per cent per ton of
2240 pounds, is now \$20, on which there is a
duty of \$3 per ton. The following tables show
the actual cost of production and transportation
in this State:

SAN LUIS OBISPO COUNTY.	
Royalty to owner of land.....	\$2 00
Cost of mining (hand labor).....	3 00
Hauling to railroad station.....	2 50
Rail and steamer to San Francisco.....	3 50
Toll.....	05
Ships freight to New York.....	5 00
Insurance and charges.....	1 00
Total.....	\$17 40
Margin for profit.....	2 60
Average ores 47 per cent.	

PLACER COUNTY.	
Royalty to R. R. Co.....	\$ 25
Mining done by hand labor.....	3 00
Hauling to R. R. (long distance, toll roads).....	8 00
R. R. freight to San Francisco.....	3 00
Hauling to ship; toll.....	70
Ships freight to N. Y.....	5 00
Insurance and charges.....	1 00
Total.....	\$20 05
Best ores, 52 per cent.	

DEL NORTE COUNTY.	
Mining done by hand labor.....	\$ 3 00
Hauling to schooners.....	3 00
Schooner freight to S. F.....	4 50
Hauling to ship; toll.....	75
Ship freight to N. Y.....	5 00
Insurance and charges.....	1 00
Total.....	\$17 25
Margin for profit.....	2 75
Total.....	\$20 00
Average ores, 75 per cent.	

These show the principal places of supply and
the cost of chrome-iron ore. It will be seen
that even from the most favorable deposits
there is hardly a margin of profit left, the in-
dustry being thereby cramped. The profit
would be wiped out if foreign chrome ores
stood on the free list; but the chrome industry
would be one of some magnitude if duties were
placed at, say \$10 per ton, and correspondingly
on the products. Then the poorer classes of
ores could be worked. Being distributed on
private, railroad and Government land, there
would be free competition in working the de-
posits. The advantages derived from miners'
wages, teamsters' work, freight by rail and
water, would all be sacrificed were chrome-
iron ore on the free list as proposed. The im-
port duty is now \$3 per ton, and for the past
year the value has been \$20 per ton in the
Atlantic States, duty paid. With a production
in California of 5000 tons a year, one interest,
worth \$100,000 a year to our home industries,
would be wiped out were this comparatively
insignificant article put on the free list. The
matter will be called to the attention of the
Congressional delegation of California.

The general supply of the world comes from
the Mediterranean sea, Turkey and Asia
Minor, where it is produced by slave labor,
and by foreign ships finds easy access to our
markets. Turkish ore make the commercial
standard of 50 per cent, while California ore,
with rare exception, do not average more than
45 per cent. Our domestic production has
been decreasing, but importations from Turkey
and Asia Minor have more than compensated
for this, so that the total amount consumed in-
creased. There has been also a corresponding
increase in the importation of manufactured
products.

Foundry Notes.

The Union Iron Works have completed the
change on the steamship Walla Walla, which
has been transformed from a collier into a pas-
senger steamer. She started on her first trip to
Victoria this week. The Walla Walla has now
fittings equal to any on the coast. She has an
electric-light plant and is supplied with every
appliance that can add to the comfort and con-
venience of the passengers. The work on her
at the iron works has taken about five months'
time, and the cost was upward of \$150,000.

The Iron-Molders' Union has adopted resolu-
tions condemning the subletting of Califor-
nia contracts to Eastern and Scotch companies.
Union No. 104 will refuse to work for any firm
subletting California work to foreign or Eastern
manufacturers on contracts taken after Nov.

14th. A committee was appointed to wait
upon Adolph Sutro, to request that labor on the
engine for the Howard-street cable line be per-
formed in this city.

The Colliery Disaster.

Another one of those terrible disasters peculiar
to coal-mining regions occurred at Pittsburg,
Kansas, on Tuesday of last week. The ex-
plosion occurred at a time when there were 150
men in the mine, most of whom were at work
at a point 112 feet below the surface. Up to
Sunday at 6 o'clock 39 bodies had been recovered
and also 20 wounded. Of the latter, not to
exceed five will die, probably not that many.
It is thought they have all been discovered.
There were 150 men in the mine at the
time of the explosion, those over and above the
number of killed and wounded having escaped
soon after the explosion by way of the air
shaft.

Superintendent Craig is convinced that the
explosion was due to the ignition of coal dust
following an overcharged blast. Some of the
old miners are inclined to the theory that the
explosion is due to the striking of a pocket of
natural gas. Lack of proper ventilation was
probably the real cause. There is by no means
proper attention given to this matter in this
country, where, even if there are laws on the
subject, they are not rigidly enforced. If the
men themselves who work in the mines were to
emphatically insist on proper measures being
taken, and call the attention of the authorities
to the matter, it would be remedied. Ventilating
apparatus and appliances are expensive to own-
ers, and they omit them as long as possible, tak-
ing chances which sometimes cause them loss of
money, but to the miners loss of life. If the
owners are careless of these things the miners
should not be. The trouble seems to be that so
many men can be found to work in places that
are known to be dangerous that those who will
not be apt to be out of a job. Still the law
ought to take the matter in hand. A large
number of the men killed in this disaster were
Italian and French, who work cheap and are
not apt to make complaints.

About a thousand of the miners met this week
in the vicinity of the mines to take action on the
subject of the explosion. Resolutions strongly
condemning the State Mine Inspector were
adopted and his removal demanded.

Portland Manufacturing Establish- ments.

Our correspondent, in a late circuit of the
manufacturing establishments of Portland, Or-
egon, was surprised at their number and vari-
ety. It is said that the manufacturing indus-
tries of that city employ nearly 3500 men, and
the total value of their annual product is
\$8,000,000. As to iron or metal working estab-
lishments, the Union Iron Works employ 45 to
50 men in a general line of machine work.
Here they are two or three months behind
their orders, and contemplate enlarging the
works to double the present capacity.

The Willamette Iron Works employ 90 to
100 men, mainly in steamboat or marine work.
At present they are completing a sub-contract
from the Union Iron Works of S. F., in put-
ting machinery into a steamer. The Portland
Iron Works employ 35 to 50 men. Here, en-
gine and sawmill work and regrinding and re-
corrugating flour-mill rolls are specialties. The
City Foundry (J. Honeyman & Co.) employ
20 to 25 men. A large business is done in cast-
ing iron fronts for buildings, manufacturing
sawmill machinery, etc.; B. F. Honeyman
superintendent. Smith Bros. & Watson em-
ploy 90 to 100 men. They manufacture bridge
work, and are at present engaged in casting the
iron front for a new hotel in Portland. Weed
& Heintz employ 10 to 12 men, but will soon
increase to 20. Plumbers' supplies and hard-
ware are specialties. The Oregon Brass Works
(D. M. Moore proprietor) are kept busy most of
the time on job-work, but manufacture all kinds
of brass goods, and cast bells weighing as heavy
as 1000 pounds. Trenkman & Wolf employ
20 men, and at present are engaged in bone-
work, boiler and bridge work.

There are many smaller machine shops and
foundries and scores of sawmills, box factories,
planing mills, etc., all of which evince an ac-
tivity in the manufacturing interest which
speaks well for the future prospects of the city.

California Iron.

Governor Waterman has several hundred men
at work grading on his railroad, which is to run
from San Diego back into the mountains. Con-
cerning it he says: "I want to push that road
out about 200 miles, right into the iron mount-
ains, where iron can be got; and I hope to see
big rolling-mills at San Diego, where this iron
will be turned into rails and other articles gen-
erally necessary. There is a big mountain out
there of magnificent iron, called Iron mountain.
I want to see this iron utilized for shipbuilding
and other purposes, too, here as well as in the
South. I have some big schemes in my head
about this railroad and these mountains of iron,
and I think I will eventually get them on a
paying basis."

It is greatly to be hoped that the expectations
of the worthy Governor will be realized, but
there are many difficulties to be overcome. The
greatest of these is lack of proper fuel. We
have no good hard coal in this State, what has
been found being not only scarce but compara-
tively inferior. Charcoal to be used profitably
must be made near the iron ore. The only at-
tempt on any large scale to make iron in this
State was that at Clipper Gap, Placer county,
but litigation, a disastrous fire, and other causes
put an end to work there.

There were only about 900 tons of pig iron
made on this coast last year, and that was in
Oregon. The new furnaces erected not long
since will make a better showing for this year.
But California turned out no iron at all last
year. There is plenty of iron ore here, but cir-
cumstances have so far proved unfavorable to
its utilization.

The Debris Investigation.

Two of the members of the recently appoint-
ed Debris Commission are absent in Oregon on
professional work connected with harbor im-
provement, but will shortly return, when,
doubtless, the commission will be organized and
work commenced. What plan will be pursued
it is too soon to state, as no meeting has yet
been held to decide on any course. The region
affected will, of course, be carefully examined
by the members of the commission. It is prob-
able, too, that parties interested will be asked
to give required information. There is already
a vast mass of testimony collected which is ac-
cessible to the commission. In order that our
readers may be reminded of exactly what this
commission is authorized to do, we here reprint
the Bigge bill, which created it:

Be it enacted by the Senate and House of
Representatives of the United States of Amer-
ica in Congress assembled, that the Secretary of
War is hereby authorized and directed to
detail three officers from the Engineer Corps
of the United States army as a commission for
the purpose of making a thorough examination
and investigation of the mining-debris question
in the State of California, for the purpose of as-
certaining whether some plan can be devised
whereby the present conflict between the min-
ing and farming sections may be adjusted and
the mining industry rehabilitated; and for a
complete examination of the injured navigable-
river channels, their tributaries and lands ad-
jacent thereto, with a view to the improvement
and rectification of said rivers. And that the
sum of \$10,000, or so much thereof as may be
necessary, is hereby appropriated, out of any
money in the Treasury not otherwise appropri-
ated, for the purpose of carrying into effect the
provisions of this Act, said sum to be expend-
ed at the discretion of the Secretary of War,
the said commission to report as early as prac-
ticable to the Secretary of War the result of
their investigation, and the Secretary of War
shall make report thereof to Congress.

On Monday of this week, at Butte, M. T.,
the brake-reel of the St. Lawrence mine burst
with terrific force, and large and small pieces
of the wreck were hurled in every direction.
One piece of iron weighing nearly half a ton
struck a woodpile near the office and caused a
stampede in that building. Fortunately, no
one was hurt. The cables and cages fell to the
bottom of the shaft. It will be ten days before
the mine starts up again.

H. C. PERKINS, formerly superintendent of
the North Bloomfield gravel mine, Nevada
county, more recently of Callao mine, Vene-
zuela, looked in upon his New York friends the
other day on his way to Mexico on mining
business.

THE students of the Mining College at the
University of California are about to undertake
the mapping of the geological formation of the
country back of Berkeley.

Manufacture of Sulphuric Acid.

In continuing Mr. Adams' history of the progress in the concentration of sulphuric acid, Figs. 10, 10a and 10b, illustrate the outcome of much experimenting from 1870 to 1880. Made from the original without change, they will clearly prove, to those but now commencing the use of iron, the perfect knowledge of the subject which the designer possessed. Except constructively, there is little room for improvement in this apparatus, and the successfully working plants of to-day will be found to closely follow in principle, if not in form, this design of a still worked in 1876. In the light of well-known facts, it is difficult to understand why this virtually perfected principle was not adopted by the trade generally, or at least added to the glass and platinum apparatus in all large works, especially where pyrites was used.

It is not uncommon to find an investment of \$20,000 to \$30,000 in platinum stills, pans, etc., in a plant for an output of 30 to 40 tons commercial vitriol daily—several of our American works being equal to this demand. Such an outlay, with attendant wear and tear, interest, and chances of destruction from various causes, can, of course, be borne by but few companies; and the actual cost of running such a plant, though conceded to be very great (some authorities putting it at not less than 20 per cent per year on the investment) has never been published by those alone competent to give figures extending over a term of years.

Several causes, unnecessary to discuss, have combined to bring these foreign-made stills into use in this country, yet in Europe it is an open question, considering all things, whether the cost of concentration is much less in them than in glasses. Investigations into minor details of costs, losses, etc., are more systematically pursued by the chemists of the Old World, and a primary factor, acknowledged by them in this connection, has been, as yet, very little understood by owners of works in America. This is the very rapid destruction of platinum by nitrogen compounds—a common trouble, too often credited to base elements in low-grade blimestone or pyrites ores. Chemists are fully aware how difficult it is to rid sulphuric acid from any small percentage of nitrous acid, and that after many costly experiments the cautious use of ammonium sulphate is now wholly relied upon for this purpose. Considering the few works making use of any process for neutralizing nitrogen compounds, there can be no question but that glass retorts are preferable to platinum alone for general service—certainly so where pyrites containing arsenic is used, and where the demand is for 66° B. acid alone.

Dredging for Gold in Rivers.

(Continued from page 325)

character of the country and the rivers is about the same as here, except that the current is much swifter there.

The scows or punts are moved with five wire cables so as to be held stationary. The cables are handled by means of a windlass. The current wheels are made of boards roughly fastened. The wheels are from 20 to 25 feet in diameter, and make about two revolutions per minute. Although we have before given an

most ridiculous patterns having been sent out from England. These are to work the sea-beaches on the west coast of New Zealand, which in former days were very rich and are now known to be rich under water in the bays and estuaries. They have had no success in beach work with machinery so far. At Hokitika and Kumara, on the west coast of the south islands, experiments are now being made with steam dredgers sent from England. They have been working them by hand for years with shovel and sluice-box. The "beach-combers," who do the work, live like Chinamen. There

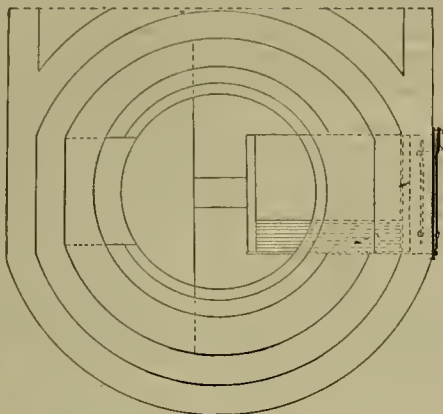


Fig. 10a.—PLAN OF FIG. 10.

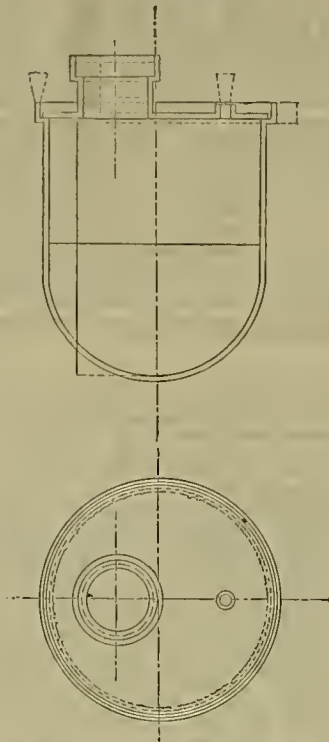


Fig. 10b.—SECTION AND PLAN OF POT.

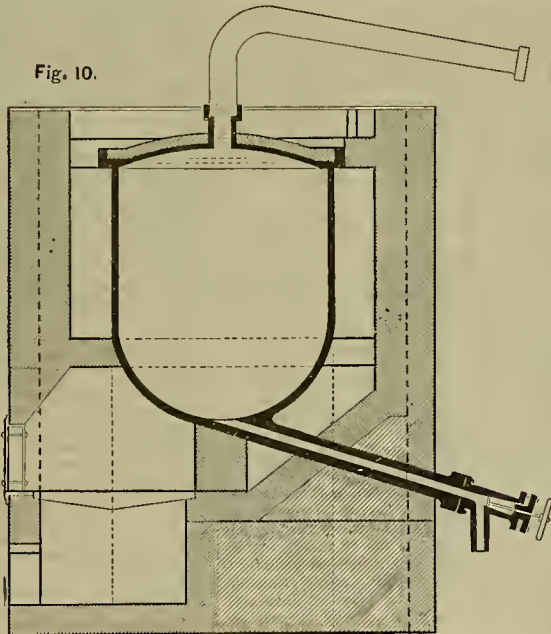


Fig. 10.

FIG. 10.—IRON SULPHURIC ACID STILL OF 1870.

engraving of the steam dredger, we herewith reproduce it as a matter of interest in view of the facts here given. The form which has been found most practical is that given in the drawing, except that water-wheels are used for power in most of them.

This same steam dredge illustrated has been working some time. Mr. Rumble talked with Mr. Kinoid, the owner, who said that on the ground it worked the first year it paid 40 per cent; the second year it paid 30 per cent; the third, 20 per cent; and now it is paying from 10 to 12 per cent.

Mr. Rumble says he saw a small experimental dredge called the Wallman, which is worked on the suction principle with a pipe seven inches in diameter, and doing pretty good work. They are talking of building one with a 12-inch pipe, and it may succeed there.

Mr. Rumble says that various attempts are being made with suction dredgers, some of the

is more gold in the black sand than there is in California. Where the steam dredgers are at work is on sloughs at a little island, there being no snrf.

MANUFACTURERS' ASSOCIATION.—The Manufacturers' Association has elected the following officers: William Harney, president; C. T. Woodhury, vice-president; Geo. O. Hickox, secretary; and A. S. Hallidie, W. T. Garratt, Irving M. Scott, N. W. Spaulding, C. T. Woodhury, A. W. Starbird and William Harney, trustees.

Work has been begun on the Pen Darren incline, at the Livermore coal mine, and now men are engaged in sinking on the vein. Additional hoisting machinery has been put in operation and a large gang of men is at work.

THE West Chollar mine has been "listed" on the San Francisco Stock and Exchange Board.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents to Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING NOV. 6, 1888.

392,488.—CENTRIFUGAL PULVERIZER—Jos. Behm, West Point, Cal.

392,412.—WEEDING HOE—W. Dages, Murphys, Cal.

392,562.—ORE-FEEDER—F. A. Huntington, S. F.

392,565.—MAP OR CHART SUPPORT—W. H. Larew, Mariposa, Cal.

392,462.—HEATING AND COOKING RANGE—R. Savage, S. F.

392,474.—WASHING-MACHINE—J. H. Therien, S. F.

392,530.—DRAFT EQUALIZER—L. N. Woodle, Albany, Ogn.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WASHING MACHINE.—Jos. H. Therien, S. F. No. 392,474. Dated Nov. 6, 1888. This washing machine consists of an inclosing outer cylinder formed of staves, which are heveled inclined or so fitted as to form ledges in the interior, and a cylindrical drum rotating within the exterior casing, said drum being formed of peculiarly shaped bars or slats; devices for turning and spreading the contents of the cylinder are fixed within it.

CENTRIFUGAL PULVERIZER.—Joseph Behm, West Point, Calaveras county. No. 392,488. Dated Nov. 6, 1888. The disk of this rotary pulverizer is set in rapid rotation by means of power applied through a pulley on the shaft, and ore is fed into the apparatus at intervals. The rapid rotation of the heaters acts to crush the ore by striking the particles, and also by their attrition with each other and by being forced against the projecting angles of stationary dies within the casing, the discharge taking place through discharge openings.

ADJUSTABLE MAP OR CHART SUPPORT.—Wm. H. Larew, Mariposa. No. 392,565. Dated Nov. 6, 1888. This is an apparatus for use in schools and for similar purposes, and it consists of a frame and adjustable sliding boards guided so as to travel up and down upon the standards of the frame and connected together so as to be moved simultaneously. It also consists of clamps and holders for charts and papers. The boards may be used simply as blackboards to be written or marked upon, or they may serve the purpose of supporting paper or prepared cloth upon which it may be desired to draw permanent diagrams or figures, and they also serve to support charts or maps for other instruction. The whole device can be folded closely together at any time for transportation or to set it aside out of the way. It is light, portable and strong.

HEATING AND COOKING RANGE.—Richard Savage, S. F. No. 392,462. Dated Nov. 6, 1888. This stove or range is so constructed as to be employed for the ordinary purposes of cooking, and also to supply heated air, which may be conveyed to any desired point from the range. It consists of a base or cold-air chamber under the stove or range, into which pure air is received from beneath or outside the house, a fire-box grate, and ash-pan of the usual or any suitable construction, a top arranged in the usual manner for cooking, and an oven, and, in combination with these, of a series of flues and passages, through which air is admitted and conducted around the heating flues or spaces to a suitable discharge from which it is conveyed away. Several rooms may be heated by the surplus heat taken from the kitchen-stove or range, and the atmosphere of the kitchen will, at the same time, be much reduced and made more comfortable to the occupants.

GOLD-MEDAL AWARDS.—At a meeting of the trustees of the Mechanics' Institute this week, Irving M. Scott, as the representative of the Union Iron Works, was presented with the handsome medal awarded by the Mechanics' Institute to the Union Iron Works for the best display at the late fair of California-manufactured articles. Chas. O. Farciot was presented with the "Inventor's" medal for his Mariners' Automatic Registering Compass, an ingenious contrivance for registering the course made by vessels at sea. Both medals are of gold and bear handsome inscriptions on one side, and the personified figure of California on the reverse. The value of each is \$100.

THE Candelaria Con. Mexico Mining Co. of San Dimas, Durango, Mexico, has declared a dividend of 50 cents per share, aggregating \$50,000, payable immediately at the office in this city.

MECHANICAL PROGRESS.

The Iron Supply of the World.

One-third of the pig iron produced in the world is consumed in railway construction. In 1888 the railways of the world consumed about 7,660,000 tons of pig iron. Few people not engaged in some branch of the iron trade are aware what an immense revolution was effected when iron rails began to be generally supplanted by steel. At first the question was, "What shall be done with the old iron rails?" Now, with many there is a fear that there may soon occur a dearth in that kind of iron. Scrap iron is already in greater demand in this country than can be met by the ordinary supply. The whole civilized world is now scouring for scrap iron.

In California scrap iron is very scarce. Men are scouring all the South American coast for old iron to ship to San Francisco. Our rolling-mills are obliged to look over to Europe for a supply sufficient to keep their machinery in motion. The matter of commencing again the production of pig iron in this State is now under consideration.

So great is the demand for old rails all through the country that there has been quite an advance of late in the price. This advance has again brought up as a subject for discussion the question, "How large is the reserve of that rare material still in the tracks?" The opinion is frequently expressed that before long the supply will be exhausted, and that then certain industries dependent upon old iron rails will be forced to turn to something else. Yet, on a careful study of the subject it is found that the day when the last iron rail will be taken up is further away than the majority of those interested seem to think, unless the data collected by the authors of Poor's Manual are based on inaccurate returns. According to that publication, in seven years last passed, the mileage of iron rails has been reduced by 21,579 miles, so that at the same rate of exhaustion the supply would last nearly 20 years longer. Of course there are many considerations influencing the rate at which our rail-mills and the works running on track material draw on the reserves. The questions of the relative cost of new steel rails, of accessibility of the old material, of the future demand for finished product, of the relative cost of old iron and new steel, angles, bars, spikes, etc.—all these considerations affect the problem. But the scare of an early end of the supply of old rails may as well be dismissed. They will last ten years longer at least.

THE MANUFACTURE OF PORTLAND CEMENT.—This cement is a commodity which has been in enormous demand almost everywhere. But although so universally used, you will not find one man in ten who can tell you what it is composed of, so a little light on the matter may be acceptable. Portland cement is an artificial product, chemically proportioned by the proper selection of the material entering into its composition. These, whether chalk or clay, as in England, marl or clay, as in Germany, or hydraulic limestones, as in this country, are in every case reduced to the finest powder by either wet or dry grinding, and this powder moistened merely in the dry process, or in the form of paste in the wet process, becomes practically, either by drying in large tanks or by being molded into bricks, eggs or other forms, a new stone, into which all the elements are brought in close contact and are in perfect chemical proportions. The artificial-made new stone burnt, as it is, at high heat in close kilns, has all elements chemically active, and the clinker represents practically, when properly proportioned chemically, a composition of hi-basic silicate of lime and aluminate of lime. This ground clinker is the Portland cement of commerce, a fixed uniform product, sold under a warranty of its strength and firmness, and depends upon the controllable elements of skilled manufacture for its character and uniformity.—*Commercial Bulletin.*

BUTTER AND NAILS.—"When England furnished America with all the nails she used it required ten pounds of butter to purchase ten pounds of nails. To day, in the same locality in America, one pound of butter will purchase ten pounds of nails, and of a much better quality than those received in the old days from England. If America had not adopted her protection policy, she would still be producing cheap butter to exchange for dear nails. Other countries prevailed, and, under an almost prohibitive tariff, nail works were established. To-day America produces all the nails she uses, and is able to sell them at a price far below that charged before the tariff was imposed. In the meantime butter and all other agricultural produce have risen in value, on account of the increased demand for home consumption in local manufacturing centers, and the condition of the farmer is vastly more prosperous." The above was penned by a writer in the *Morning Post* of London, a British Tory Free Trade organ, which differs from some American Free Trade organs in that it sometimes admits to its column truths that tell against its pet hobbies.

ALUMINUM STEEL.—A new metal to be known as "aluminum steel" has been produced at the laboratory of Messrs. Brin, College street, Belvidere road, Lambeth, Eng. A charge of about 40 pounds of broken cast iron, smeared with clay and a special flux, was trans-

formed, by the direct action of heat, in a small ordinary foundry furnace into excellent steel containing two per cent of aluminum. Under a Fletcher's blowpipe and Brin's compressed oxygen, a strip of iron is not only covered, but so amalgamates in the aluminum as to become practically a hard and elastic steel.

CHEMICAL VS. MECHANICAL TESTS.—In the *Ironmonger*, London, Mr. H. J. Skelton attempts, on behalf of steel works, to dissuade engineers from adopting a standard of chemical analysis, denying that the present state of the scientific branch of metallurgy (chemistry) warrants laying down a standard for soft-steel manufacture, such as is proposed by the ex-president of the Iron and Steel Institute, Mr. Daniel Adamson. Of the four metalloids—carbon, silicon, phosphorus and manganese—permitted to be present, it is impossible to exactly fix and control the proportions. He praises the recent paper of Mr. R. A. Hadfield on manganese, and then says: "Who knew the peculiar effects and properties in varying proportions thereof prior to its publication? Look at the effect of aluminum on cast iron and the mottos castings. What is to be done to arrest oxidation in steel, which has of late so alarmed shipowners and made the makers of iron plates busy for months? Of what use is chemical analysis and mechanical test in the higher forms of steel—in crucible cast tool-steel? The principal ground for antagonism to fixed chemical tests is the utterly unscientific and reactionary state of mind it reveals. Far too much of arbitrary limitation already exists in steel manufacture."

A NEW TELEGRAPH WIRE.—Mr. D. H. Craig of New York, who has devoted 19 years to the development of machine telegraphy, and who, among many other things, claims to be able to telegraph 2000 words per minute from each end of a wire, a total of 4000 words in 60 seconds, has recently devised a new telegraph wire, made of pure copper with a slight mixture of silica, which is said to increase the tensile strength to twice that of steel of equal size, the exact tensile strength being reported at 133,000 pounds to the square inch. An ordinary No. 4 gauge wire weighs over 900 pounds per mile, and has but one ohm of electrical resistance per mile. With such a wire extending from New York to San Francisco, the electrical resistance would be about 3000 ohms, while a majority of the telegraph wires between New York and Washington show an electrical resistance of more than 4000 ohms. The significance of the facts is that the new siliconized copper wire will bring San Francisco nearer to New York, electrically, than New York is to Washington.

IMPROVED RAILWAY STATIONS.—The great improvement which has taken place in the methods of railway construction and equipment within a few years is exemplified, says the *Railway Age*, among other ways, by the increased taste and expense shown in connection with station buildings. The ordinary railway station in the United States until recently had been a hideous structure of pine boards, generally painted red, if painted at all, and consisting, except at the larger points, of one or at most two rooms for the accommodation of passengers, with a little den for the ticket seller. The interior was cheerless and repulsive, and the exterior was as devoid of architectural taste and beauty as a monstrous dry goods box. But this era of unnecessary ugliness seems to be passing, and now railway companies are devoting much attention to the construction or enlargement of their stations great and small, not only to making them comfortable and convenient for passengers and employees, but also to making them architecturally attractive without.

ACCIDENTAL ALLOYS.—The great changes which are produced by small proportions of foreign matter in metals are not necessarily of small practical importance, as very slight impurities in metals for certain purposes might lead to serious consequences. Robert Austin gives two striking illustrations of this possibility. A small fraction of bismuth in copper will reduce its electrical conductivity sufficiently to cause any submarine cable made with it to become a commercial failure, and the message-carrying power of copper cables is said to have doubled since the early days of telegraphy, on account of the increased purity of the copper. Pure gold has a breaking strain of from 16 to 17 tons to the square inch; but when alloyed with but two-tenths of one per cent of lead it will break with a slight blow under a trifling strain.

TO TEMPER STEEL ON ONE EDGE.—Red-hot lead is an excellent thing in which to heat a long plate of steel that requires softening or tempering on one edge. The steel need only be heated at the part required, and there is little danger of the metal warping or springing. By giving sufficient time, thick portions may be heated equally with thin parts. The ends of wire springs that are to be bent or riveted may be softened for that purpose by this process, after the springs have been hardened or tempered.

A PORTABLE TURNABLE has been invented by J. W. Warburton for the turning of cable cars when stopped by fires, broken gripe or other causes. The table is constructed on wheels, built in sections, and can be hauled to any spot by horses or by the cable itself. The table is built of iron and weighs 12,000 pounds.

SCIENTIFIC PROGRESS.

Heat from Electricity.

Little has yet been done in heating by electricity. The common belief is that it would be too costly. We can get 60 per cent of the total energy as useful heat from a furnace and but 10 per cent from an electric current derived from a dynamo run by steam. Stoves do most of the heating in towns, and they give but one-fourth of the total energy in useful heat. Three-fourths of the heat passes up the chimney. Air rushes through crevices of doors and windows in draughts which are injurious to health.

Suppose the case of a house heated by electricity in a town. Let the current come from the central station and heat coils of flat-iron wire. These coils may each cost less than a dollar, and they may be in any part of the house. For cooking and baking the coils may be placed just under or around the vessel holding the article cooked. Less heat than usual would be required, for no soot would be on the bottom of the containing vessels. The fire risk would be much less than at present, as the wire never need be hot enough to cause fires. The heat supply can be turned on or off instantly; thus there will be no loss of fuel when the need of heat has ceased. This applies with great force to summer use.

In heating, cooking or baking, the temperature can be easily kept uniform. Without rising in the morning, the touch of a button at the bedside will turn heat on several coils in different parts of the house. The nuisance of kindling, smoke, ashes and soot will be abolished, and no stove-pipes and chimneys will be needed.

I have said that we may get 10 per cent of the heat energy expended at the central station, and that in using a stove we may get 25 per cent. When we count the cost of stove-pipe, chimneys, shovels, ash-efters, kindling, trouble and great fire risk, I believe electricity will be found the cheaper.

When the dynamo at the central station can be driven by water, great economy may be obtained. Water-power can be supplied ten hours a day at \$20 and steam at \$50 to the annual horse-power. In this case steam costs two and a half times as much as water. From my previous statements it will be seen that electric heating would cost two and a half times as much as heating by stoves, and in using water-power to generate electricity the heat will cost the same as when produced in stoves, even neglecting the cost of stove-pipes, chimneys, etc.

Platinum wire has been used for electric heating, but surely the fact that iron is as good must have been ignored. The conductivity of soft iron is nearly as low as that of soft platinum. The ratio of the temperature of melting is as 20.73 to 18.03, and the cost nearly as 1 to 5000. I propose to use flat wire, for better results will be had when the heating surface is large. The coils may be suspended from the ceiling.—*Electrical World.*

Electrical Production of Diamonds.

The Hon. C. A. Parsons describes, in an interesting communication to the Royal Society, which is published in abstract in *Engineering*, a number of experiments which he has recently made on carbon at high temperatures and under great pressures, and in contact with other substances. The primary object of the experiments was to obtain a dense form of carbon for use in arc and incandescent lamps, for, as it is well known, could the life of the carbons of either lamp be prolonged, a considerable economy would be effected in electric lighting. Looking at the experiments from this point of view, it may be stated that the test trials were not entirely successful, though a very dense form of carbon was in one case obtained, but nevertheless some results are of very great interest, as, though the author expresses himself very cautiously, it would appear that he has succeeded in producing diamond dust artificially. The arrangement of the experiment was as follows:

A massive cylindrical steel mold of about three inches internal diameter and six inches high was placed under a hydraulic press, the bottom of the mold being closed by an epigot and asbestos rubber packing—similar to the gas check in guns; the top was closed by a plunger similarly packed; this packing was perfectly tight at all pressures. In the epigot was a vertically bored hole, into which the bottom end of the carbon rod to be treated fitted; the top end of the carbon rod was connected electrically to the mold by a copper cap, which also helped to support the carbon rod in a central position. The block and epigot were insulated electrically from the mold by asbestos and the leading wires from the dynamo being connected to the block and mold respectively, the current passed along the carbon rod in the interior of the mold. The free space in the mold was filled in turn with different hydro-carbons and with other materials. Among the liquids acted on were benzine, paraffine, treacle, chloride, and bisulphide of carbon, and the solids included silica, alumina, carbonate, and oxide of magnesia and almina. The pressure employed ranged from 5 to 30 tons per square inch. In the experiment with silica the density of the carbon was increased 30 per cent, and in no other case. The most interest-

ing set of experiments was when the mold around the rod was filled with a layer of slaked lime about one-fourth inch thick, surrounded by two inches of silver sand, followed by a layer of lime of the same thickness, and finally by a layer of coke dust. The pressures used ranged from 5 to 30 tons, and the current from 200 to 300 amperes, the carbon being in different experiments from one-fourth inch to five-sixteenths inch in diameter.

Under these conditions there was obtained on the surface of the carbon rod a powder of a gray color, harder than emery, and capable of scratching the diamond. This powder is, therefore, very probably the diamond itself.

AIR IN WATER.—A correspondent asks the *Manufacturer and Builder* why it is that in compressing water the air is not forced out—which is found not to be the case. The answer to the query furnishes some facts that may be interesting to our readers. We reproduce it as follows: "Water, as well as many other liquids, has the property of absorbing many gaseous substances without thereby increasing in volume. Far from reducing the capacity of the liquid to absorb a certain gas, the application of pressure increases it, the law being substantially that the amount of gas absorbed increases directly as the pressure increases, and vice versa. Thus, if water at ordinary atmospheric pressure will absorb one-fourth of its volume of air, at two atmospheres it will absorb another one-fourth, at three atmospheres another one-fourth, and so on. The capacity of water to hold large volumes of gaseous substances under pressure is well shown in the familiar example of carbonated waters. These are bottled under considerable pressure, the gas itself furnishing the pressure, in order that they shall become charged with a great quantity of the gas, which, being liberated as the pressure is removed by drawing the cork, gives rise to an agreeable effervescence. In absorbing or discharging the gas, however, there is no change in the volume of the liquid. The process of gas absorption may, in fact, be compared with the act of dissolving a salt in water. The salt finds its way in some manner among the molecules of the liquid without increasing its bulk; so also does the gas. There are exceptions to the rule, however, as where an actual chemical union takes place between the liquid and the gas; but this is not the case with air and water, which is simply a case of the solution of the atmospheric gases in the liquid."

CONDENSED LITERATURE.—"The tendency of the times," remarks the *Norwich Courier*, "is toward condensation. We have condensed beef, a small portion of which, dissolved in hot water, gives one a draught containing as much nourishment as a whole beefsteak. We also have condensed milk, and condensed food of other kinds, which contain a maximum amount of the essential quality within a minimum amount of space. How far this tendency toward condensation will eventually carry men in the matter of food, it is difficult to predict. Perhaps the time will come when the art of extracting and condensing the active principles of costliest meals will be so advanced that one may be able to obtain in a small pellet as much refreshment and nourishment as he now obtains in a whole meal. Then, all the time now consumed by the good housewives in preparing breakfast, dinner and supper, and by the business members of the family in going to and from and eating their meals, will be saved. There will be no roasting over the kitchen stove, no trouble washing dishes, no worry over a varied bill of fare, no agitation over broken china, etc. A person will carry a few food pills in his pocket, and when he grows hungry will take one and swallow his whole meal at once, perhaps." To the above we might add that the great need of condensation required, just at this time, is newspaper condensation. Our papers, daily and weekly, should be reduced fully one-half in number and fully three-quarters or more in matter. The labor and time required to select the really valuable matter in the average newspaper has become a most grievous tax upon the average reader and one that should be promptly abated.

A REMARKABLE TELEPHONE.—The *Hartford Courant* remarks: The Adjutant General's office at the capitol has been connected with the room of the Quartermaster-General on the third floor by means of a Hall short-distance telephone line. The wire employed is composed of six strands of steel, wound around a cord covered with a preparation of paraffine, which prevents induction. No battery is required, and the voice of a person standing in the room at a distance of 20 feet from the instrument can be distinctly heard at the other end of the line. By means of this remarkable invention the Adjutant-General and his associates can carry on a conversation with those connected with the other departments without leaving their desks. The new telephone has been used with great success in other cities. The limit is five miles, but the inventor hopes to exceed this in the near future. It is to be hoped that this new telephone will be instrumental in breaking up the present outrageous telephone monopoly, at least for short distances.

THE HUMAN STEP.—Among the continental armies the German soldiers have the longest legs, judging by the length of step. It is 80 centimeters. The step of the French, Austrian, Belgian, Swiss and Swedish is 75 centimeters, and of the Russian, 71. Thirty centimeters make a foot.

USEFUL INFORMATION.

Twenty-Four Grammatical Readings of the Same Line.

To illustrate the numerous grammatical changes which can be made in a single line or sentence, the following may be presented:

The weary plowman plods his homeward way.
The plowman, weary, plods his homeward way.
His homeward way the weary plowman plods.
His homeward way the plowman, weary, plods.
The weary plowman homeward plods his way.
The plowman, weary, homeward plods his way.
His way the weary plowman homeward plods.
His way, the plowman, weary, homeward plods.
The plowman, homeward, plods his weary way.
His way the plowman, homeward, weary plods.
His homeward, weary way, the plowman plods.
Weary, the plowman homeward plods his way.
Weary, the plowman plods his homeward way.
Homeward his way the weary plowman plods.
Homeward his way the plowman weary plods.
Homeward his way the weary plowman plods.
The plowman, homeward, weary plods his way.
His weary way the homeward plowman plods.
Homeward the plowman plods his weary way.
Homeward the weary plowman plods his way.
The plowman, weary, his way homeward plods.
The plowman plods his homeward weary way.
The plowman plods his weary homeward way.

THE GREAT LEAKY LOG RAFT which was out adrift in mid-ocean has proved of much benefit to those who are engaged in the study of ocean currents—and thus to science. Ever since the logs which composed it have been drifting about in the ocean currents, they have been closely watched by navigators and their position carefully noted and reported by passing vessels, and now, after the lapse of several months, the office at Washington has compiled these observations and issued a carefully prepared pilot chart. This chart, which represents the course which the logs took after the raft was broken up and the points in mid-ocean in which they were found, shows at a glance the general directions of the currents and gives an object lesson to the mariner that could scarcely have been given in any other way. Of course Mr. Leary's contribution to science was an involuntary one, but it has been no less valuable on that account, and has advanced the study of ocean currents in a way that no one deemed possible before the disaster occurred. One of the peculiar features of the affair is that what happened was just what the scientists had long desired to do, but it was rather too expensive an experiment to be made voluntarily. Thousands of floating logs on the Atlantic meant too much danger to shipping to permit of the Government's placing them there. However, no serious disaster has occurred from collision with any of these logs, and the wreck of the great raft has therefore been both instructive and harmless, except to the gentleman who owned it.

A NEW HUSKING MACHINE.—A simple device by means of which the husk of corn can be easily and quickly torn from the ear has been patented by Theodore H. Mehrling of Niobrara, Nebraska. The device has jaws which open and close like sharp blades, each of the jaws having concave sides, which, when closed, form a cup-like cavity, the meeting edges being cut away at the middle to form an aperture when the jaws are closed. Each jaw has a row of short inwardly projecting teeth around the edge, with a pointed prong on the outer end to guide the ears of corn into the space between the jaws. The jaws are not in the same plane with the handles, but at a considerable angle thereto, and the large side of the handle has a sharp-edged tooth to be used to cut the silky threads on the ears. The operator holds the husker with his right hand, with the left taking an ear of corn by the outer end, when he opens the jaws and passes the pointed ends over the stem of the ear until the inner end of the husk is inclosed by the jaws, so that the stem of the ear projects through the aperture. The jaws are then closed so that the teeth penetrate the husk, when, with a slight twist, the ear is freed from the husk by breaking the stem.

MR. EDISON'S BABY AND HIS PHONOGRAPH.—According to the New York Herald, Thos. A. Edison, the inventor, has been interesting his inventive faculties with his new baby and a phonograph at his home. When the baby crowded with glee, the crow was registered on the phonograph; when it got mad and yelled, its piercing screams were irrevocably recorded on the same machine. That phonograph is now a receptacle of every known noise peculiar to babyhood. It is Mr. Edison's intention to take a record of the strength of the baby's lungs every three months. "I will preserve the record," said he, "until the child becomes a young lady. Then the phonograph can be operated for her benefit, and she can see for herself just what kind of a baby she was, and won't have to take her mother's and the nurse's words for it."

THE BURNING-GLASS AGAIN.—In discussing the unsuspected causes of many fires, a correspondent of the New York Tribune says: "A few days ago an acquaintance of mine had occasion to repair a chimney, and in doing so put in an oak post as a support between the bricks and the garret window. The next day he discovered this post on fire, although there was no fire in

any other part of the house. He promptly extinguished the blaze, but kept a strict watch. The next day the same thing occurred, much to his alarm. Passing by, I was called in to see the charred post, and was asked for some explanation of the origin of the fire. On examining, I found a circular blister in a window glass, near the wooden support, convex enough to form a lens—a burning-glass. My neighbor was informed that on the next day promptly at 10:30 A. M. his house would in all probability be endangered again. True, the fire started, but spectators were on hand to stay it. This incident, in my estimation, does away in many cases with the ultra theory of spontaneous combustion. In factories and warehouses, where combustible goods are stored within focal distance of such defective glasses, such fires will often occur, as any one familiar with the principles of the convex lens will admit."

CLEANING CLOTHES PROPERLY.—"My experience has always been never to use either hot soap or hot water, but to use both lukewarm. By using either soap or water too hot, especially on goods that are very greasy, I find it has a tendency to set the grease, and when once set it is very difficult to loosen again. This is also the cause (one great cause, at least) for cloudy goods. As for the strength of soap, a man must use his own judgment; it all depends on what the goods are. If the goods are very thin, less strength and less soap are required; if heavy, why, of course, more strength is necessary. Some men who claim to be finishers think that the less soap used and the more alkali, the better the result. My practice is to use soap enough to create a lather, and just enough alkali to overpower the grease in the goods; by so doing we not only cleanse the fabric but also preserve the color."

A NEW USE FOR SUGAR.—The French Ministry of Agriculture has recently had a number of tests made which all go to show that meat can be preserved by sugar in a much more satisfactory manner than by salt. The salt is somewhat cheaper, but its effect is to destroy to quite a degree the nutritive qualities of the meat with which it is brought into contact; while if meat is packed in powdered sugar a coating is formed over the outside, the juices of the meat are retained, and not the least harm results. When sugar-preserved meat is to be used, all that is necessary is the soaking of it in water, which speedily removes whatever traces there may be of the preserving substance. It is thought that the result of this investigation may lead in time to important changes in the meat-preserving industry.—*Merchants' Journal.*

TO HAVE CALLAS BLOOM SUCCESSIVELY.—The following directions from the *Ladies' Home Companion* may be relied upon to produce the result if carefully followed: "A calla flower with its stem should be promptly removed as soon as it begins to fade. Cut the stem low, being careful not to injure the young bud, which you will find starting up close to the old stem. By this means three flowers will sometimes be successively produced upon a single stem. The first, of course, is the largest and finest flower of the three, though the others are often well developed. When blooming, water freely with warm water, adding a few drops of spirits of ammonia once or twice a week to encourage a strong growth."

CIDER MAKING.—By the application of artificial power in the manufacture of cider it is believed that the quantity of the same is to a great extent impaired. According to the present rapid method the apple is ground, rasped or mashed, as the case may be, goes immediately to the press and the clear juice expressed. By the old and slow method of grinding by animal power, by the old sweep motion, the ground apples fell into a large tub or vat and there remained for 12 to 24 hours or until incipient fermentation had set in, and then pressed when the cider is more highly colored and of much more body, as it is termed, and for domestic purposes much better.

ANOTHER MAMMOTH GRAPEVINE.—This new candidate for public observation is to be seen at Bayly's San Gabriel hotel, Los Angeles county. The vine is 4 feet 2 inches in circumference, and some of its branches are 15 inches in circumference and 100 feet long. Fifty-five years ago, Gen. Vallejo, a young man of 40 years, stood under its shady branches, and today, could it but feel the gratitude expressed by the tired tourist as he partakes of his meal under its lovely arbors, it would surely wish to live another century.

HANDLE KEROSENE, benzine and gasoline by daylight only. Where gasoline is stored, see to it that there is ventilation from beneath, as the vapor from it, which is highly explosive, is heavier than air, and will not ascend, but must be allowed vent below. If these precautions are observed closely, the danger of fires from these inflammable fluids will be reduced to a minimum.

SOOT ON THE CARPET.—If soot happens to be dropped on a carpet, throw down an equal quantity of salt, and sweep all off together. The soot will hardly leave a trace.

A STOPPER FOR RATS.—A correspondent says: Soak one or more newspapers, knead them into a pulp, dip the pulp in a suitable solution of

oxalic acid. While wet, force the pulp into any crevice or hole made by mice or rats. Result—a disgusted retreat, with squeals and feet, on the part of the would-be intruders.

A CHEAP ICE-CHEST.—Take two dry-goods boxes, one of which is enough smaller than the other to leave a space of about three inches all around when it is placed inside. Fill the space between the two with sawdust packed closely, and cover with a heavy lid made to fit neatly inside the larger box. Insert a small pipe in the bottom of the chest to carry off the water from the melting ice, and you have a very cheap and tolerably effective ice-box for family or grocer's use.

GOOD CEMENT.—Stir to a thick batter with silicate of soda, 12 parts Portland cement, six parts slaked lime, six parts fine lead, one part infusorial earth. Very excellent for marble and alabaster. The cemented object need not be heated. After 24 hours the fracture is firm, and the piece can with difficulty be found.

INK FOR HAND STAMPS.—To make an ink for hand stamps that will not injure the rubber, mix and dissolve 2 to 4 drams sniline color, 15 ounces alcohol and 15 ounces glycerine. The solution is poured on the cushion and rubbed in with a brush.

ARTIFICIAL PUMICE-STONE is now being made in Germany by molding and baking white feldspar and fire-clay.

ELECTRICITY can now be produced by steam at a cost of six cents per hour for 1½ horse-power.

GOOD HEALTH.

Nervous Phenomena.

The power of the imagination over the nervous system and the seat of intelligence and consequently upon muscular action has often been commented upon in these columns. We have also remarked on more than one occasion upon the contagious influence of mental excitation and nervous derangement. This is manifest in a marked degree in times of great religious excitement, when the nervous system in an ecstasy of excitation induces muscular contortion or leads the subject into exclamations of delight and joy or into manifestations of the deepest woe, and the excitement of one person is rapidly communicated to and similarly affects many others.

A remarkable case is now reported from Wilkesbarre, Pa. In a silk-mill in the place a large number of young women are employed. Normally they are healthy and strong, in fact a body of youth of exceptional physical excellence. Recently one of the young women was taken with an epileptic fit. As she had never before been thus visited, and there was nothing in her physical condition to indicate predisposition in that direction, the surprise in the workroom was very great and the alarm concerning the girl's welfare excessive. She was prostrated upon the floor, and varied her contortions with occasional piercing cries of agony. Her workmates were gathered about her, solicitous to render her aid, but naturally were much excited. Presently, and without any warning indications of the affection, one of the girls uttered a wild cry that ended in a painful shriek, and the young woman fell over in a fit, closely resembling that of the epileptic at her side. Naturally this event greatly increased the alarm and in a few moments another girl went into hysteria of the extreme character, and then in rapid succession another and another was seized and convulsed in the most violent form, until no less than 16 had either fallen to the floor or reeled about in a frenzy of hysterical madness. When the physicians reached the scene they experienced great difficulty in restoring the young women secondarily affected, while the one who had the truly epileptic fit yielded readily to the restoratives applied. Several days elapsed before any of the young women were sufficiently nerve settled to resume their places in the mill.

There can be no mistake concerning these cases; they were examples of contagious hysteria of the most valuable character to medical science, for probably no instances have been recorded that were of greater significance, as they were very sudden and very rapid in their succession. Unlike most former cases, there was preceding them no long period of mental strain, no extended brooding or abnormal disturbance of the intellectual powers, no contemporary period of long-continued and culminating excitement and gradually increasing mental tension.—*Exchange.*

WHY MEN SHOULD NOT SHAVE.—Shaving is a dangerous habit. You can trace nearly every case of toothache and facial neuralgia in a man to the habit of shaving. If all men protected their throats by chin-whiskers and the nerves of the face by a liberal growth, you wouldn't hear of half the present ailments. Shaving opens the pores of the face and invites neuralgia to step in and twitch the nerves.

ELECTRICITY FOR WRITER'S CRAMP.—In one of the broad windows of the recording department of the office of James Bond, clerk of the Superior Court, is a small electric battery, says the Baltimore Sun. It is used by the recorders for the relief of the cramp of the muscles of the hand, which follows long con-

tinued and steady use of the pen. The relief is instantaneous, and clerks who were formerly compelled at times to stop work for several days on account of swelling and contraction of the muscles of the hand now take a few gentle shocks of the electric current on the slightest approach of stiffness. They return to work at once, entirely relieved, and continue without inconvenience. Nearly every one of the score of clerks receives benefit from the electric current, and the battery is regarded as an indispensable fixture of the office.

THE TOMATO IN BRIGHT'S DISEASE.—When Thomas Jefferson brought the tomato from France to America, thinking that if it could be induced to grow bountifully it might make good feed for hogs, he little dreamed of the benefit he was conferring upon posterity. A constant diet of raw tomatoes and skim-milk is said to be a certain cure for Bright's disease. Gen. Schenck, who, when Minister to England, became a victim to that complaint, was restored to health by two years of this regimen. With many persons the tomato has much the same effect upon the liver as a small blue pill, and whether it is as a people we are less bilious than in former years, or that the doctors of the new school practice less severe remedies than did those of the past, it is certain that mercury is prescribed with less frequency than of old.

GRAPES AS FOOD.—It is now conceded by scientists and well-informed men in all professions, that as food for human beings, there is nothing in the vegetable world superior to grapes, and they not only give strength, endurance and vivacity to those who regard themselves as well, but restore the sick and debilitated to health, when eaten freely during the vintage seasons of the year, in the vineyards, or fresh from the city markets. It is also a well-established fact in grape regions that the large number of girls who work among grapes continuously throughout the season of picking and shipping, which is from September to December, or later, gain in flesh from 5 to 20 pounds, and many who come from the cities in debilitated health return to their homes well and strong.

BEAUTIFUL HEROISM.—Acts of heroism in medical life are so frequent and appear to be so natural a part of it that they are not chronicled as often as they should be. One such deed, however, recently found its way into the *British Medical Journal*, where it is mentioned as an illustration of the self-sacrifice of medical men in behalf of suffering humanity. It is the case of a surgeon in the British army named Landon. Mortally wounded himself, and with the grasp of death rapidly closing down on him, he heard a wounded soldier crying out from the sharp pain of his hurt. Forgetful of self, he crept with difficulty to where the man lay and gave him a hypodermic injection of morphia to lessen suffering, and, having given it, lay down and died by the side of the soldier.

REMARKABLE ENDURANCE BY A CHILD.—A little tot of four years and six months strayed off in England recently, and roamed about fields for 117 hours, eating nothing but the heads of growing wheat and being totally without water. When found, the child was in a semi-conscious state, but shortly came round all right and no ill effects followed. The case is mentioned by a physician in the *British Medical Journal* who says that, taking all things into consideration—the child's age, no proper food or drink for 117 hours, the exposure to the wet and cold weather prevailing at the time, the misery and the loneliness it must have endured for so long a period—it seems somewhat remarkable that life was preserved.

THE ELECTRIC LIGHT ON HEALTH.—We have noted in several of our exchanges that the electric light has been thought to affect unfavorably the health of those exposed to it. Now comes the statement from an English paper, which says that it is shown that the introduction of the electric light in the Central savings bank in London has reduced the average amount of absence from illness about two days a year for each person on the staff. This saves the bank about £640 sterling a year. The electricity costs more than gas, but the saving in clerk-hire more than makes up for this, leaving £266 per year "to the good."

HOT WATER FOR IVY POISONING.—A correspondent in the *Scientific American* writes as follows: Let me add my testimony as to the efficacy of hot water in curing the poison by ivy. The best way of applying it is to keep a spirit-lamp under the tin containing the water, and apply the water as hot as the skin will bear. The sensation of relief from the intolerable itching is so immediate and so complete that it is almost worth while to be poisoned by ivy to experience it.

EFFECT OF COCAINE AND MORPHINE.—Frank Johnson, a paper-hanger, 28 years of age, was recently sent to the Napa Asylum for the Insane. The excessive use of cocaine and morphine has brought on mania. He did not dare to go to bed for several nights, owing to the fiendish visitors that passed before his eyes. It is said that Johnson was in the habit of smoking 50 cigarettes daily.

COLORS LIGHTS are being tried in treating the insane. Red light is said to cure melancholia; blue, to quiet insomnia.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CONCENTRATORS.—Amador *Dispatch*, Nov. 10: Four Frue concentrators have been added to the McKenzie mill at Irishtown. A new water-wheel has been set up at the Reed & Askey mill at Irishtown; it was set in motion last Tuesday. They have the prospect of a two to eight-foot ledge. The Lavezzi five-stamp mill between Irishtown and New York Ranch has been completed, and will be started up as soon as sufficient water can be had.

Butte.

GOLD-DUST.—Oroville *Mercury*, Nov. 9: In its last issue the *Mercury* stated that the firm of Thompson & Kellogg of Spanish Ranch had bought this year \$27,000 worth of gold-dust from the small mines in that vicinity. A note from one of the firm corrects the figures and makes an interesting item as follows: He says: "In 1886 we purchased \$50,000; in 1887, \$27,000; and 1888 to Nov. 1, \$30,000, with a good prospect of more next year if a good supply of water can be secured." This is a remarkable output of gold when it is remembered that it is taken with picks and shovels from the gulches and mines in that vicinity.

A MISFORTUNE.—Wm. J. Hammond of Pittsburg, Penn., has commenced a suit in Chicago against Francis E. Hinkley for \$65,000. It seems that Hinkley agreed to pay the mining expenses of the Aurora mine in this county for one year for a fourth interest. Mrs. Church, acting as the agent of Hinkley, has charge of the work, and this suit is to recover the expense of working the mine. As many parties in this county have money due them from this mine, they will look with interest on the result of the suit. We understand that there are 28 laborers' liens filed against the mine, and that some of the Oroville merchants have bills against it to the amount of \$3000. Such mining ventures as this are decidedly injurious to Butte county mines. Companies are formed in the East, and some theoretical chap from the East who never saw a mine is sent out to superintend it. The consequence is, fortunes are sunk and Butte county mines fall into disrepute. On the contrary, experienced miners take hold here and make fortunes.

MILL.—C. C. Belding came down from Forbestown yesterday and reported lively times up there, and the Shakespeare mine is panning out finely. W. W. Stowe will soon have four Huntington mills in operation, and C. J. Nickerson is putting up a stamp-mill. The mines are prospecting remarkably rich, and it shows the confidence of Mr. Stone in the mineral wealth of the locality. It is only necessary to state that he has recently purchased another mine which he intends to develop. The Gorton hotel is full all the time and old Forbestown is returning to its former glory as a mining camp. May she pan out millions.

Calaveras.

UNION.—Angels *Record*, Nov. 9: Work on the Union mine is being vigorously pushed. We are informed there are good prospects in the bottom of the main shaft, but owing to the depth attained the present hoisting works are not powerful enough to sink any deeper and that work at that point has been temporarily suspended. The company, however, has a full force of men employed in sinking new shafts to more fully represent the lead. In a shaft that is now being worked on the north end of the mine, very fair prospects are obtained, and it is believed that the machinery formerly used at the main shaft will be moved there, and more powerful machinery erected in place of the old works.

El Dorado.

THE LINDEN MINE.—Cor. Placerville *Observer*, Nov. 9: I had been here a year and had never entered a mine. As we entered the tunnel we walked erect under a smooth arch of rock for some distance. We proceeded in a straight line for 800 feet, then curved to the left and advanced 800 feet and curved again to the left and continued until we were 2500 feet from the mouth of the tunnel. We passed five branch tunnels aggregating 1000 feet. These we explored on our return. Toward the farther part of the mine a tunnel has been opened up into an old incline that extends to the surface, and through this fresh air is constantly supplied, doing away with the old arrangement of air-boxes and providing a means of escape should a serious break or cave occur. At the end of the main tunnel they were following a bed of gravel from which the gold panned was taken. At the end of a branch nearly parallel with the main tunnel they were digging through porphyry and slate rock. The side branches have followed gravel-beds and will be continued in the future. Fourteen men were at work during the day shift, and as the work is extended a larger force will be required.

THREE-STAMP MILL.—Georgetown *Gazette*, Nov. 9: Charles Kane and M. S. Creagh, owners of the Last Chance quartz mine near Volcanville, are preparing to start up their 3-stamp mill. They have a 5 or 6-foot ledge, and a short run last spring went \$7 per ton.

Fresno.

PETROLEUM AND NATURAL GAS.—Fresno *Republican*, Nov. 9: Great excitement prevails in the southwestern part of the county on account of the recent rich discoveries of petroleum there. The fact that oil existed in that locality has been known for several years, but the more recent developments seem to indicate that it is present in great quantities. The people of that section are wild with excitement, and hundreds of claims have been located. A *Republican* reporter visited the recorder's office and found that 96 claims had been filed up to noon yesterday. Each person claims 20 acres, and all the land thus far filed upon is located in sections 17, 18, 19 and 20, in township 19 south, range 15 east. Oil-bearing land is located as mineral land. The oil-field is situated south by southwest of Fresno City, and about 45 miles distant, in an air line. It is about 24 miles directly west of Tulare City. What is of greater interest to Fresno than the discovery of petroleum, is the fact that natural gas in large quantities has been discovered as well. Valuable as the petroleum wells will prove if oil exists in sufficient quantities, the natural gas will be of ten times greater

value. If there is indeed a good supply of natural gas, it is quite as valuable to Fresno as it would be if discovered in Chinatown. In the East, natural gas is carried hundreds of miles in pipe lines, and to convey it the short distance of 45 miles will be an easy matter. Once natural gas is found in sufficient quantity to be useful in this county, Fresno will become a manufacturing center second to none in the State outside of San Francisco. Manufacturers are what Fresno needs, and the only thing that prevents their establishment here is the scarcity of fuel. This one drawback will be done away with by the discovery of natural gas, and it is needless to say that no time will be lost in utilizing the discovery. Some of our capitalists should give this matter their immediate attention, and if there is any natural gas in Fresno county make arrangements to bring it to this city at once.

DISCOVERY.—*Expositor*, Nov. 7: Mr. Chambers has been prospecting for some time past in the ranges adjacent to the San Joaquin river, and reports a fine discovery. Picked specimens of the rock assayed several thousand dollars per ton. It is thought that the ore will run upward of \$60 per ton on an average. Harry Sherwood is interested in this property, and both the owners are hopeful of large results. Mr. Chambers is of the opinion that the mining regions of Fresno county will soon take high rank among the mineral-producing sections of the coast.

Inyo.

RICH ORE.—Inyo *Index*, Nov. 7: Chas. Walters and Sam Gruber have commenced to develop the recent discovery east of Independence depot, in the interest of the owners. It is a most promising find, well situated and in favorable formation. An assay of the ore gives 74 per cent lead and 166.20 ounces silver to the ton. Another Cerro Gordo in that vicinity would be a big thing for our county, and it is among the possibilities.

Los Angeles.

AT THE CORA BELLE.—Newhall *Times*, Nov. 10: Rudd & Helig have started up their new washer at the Cora Belle, and the prospects are that the new machine will revolutionize mining in this district. The Cora Belle claim is covered with a clayey deposit from four to eight feet deep, and is so tenacious that it is pulverized with considerable trouble, but when powdered proves very rich. Rudd & Helig's machine fits the situation exactly and is a grand success. One man fires the clay bank, while another takes it with a team of mules and a scraper to the "dump platform," it works into the machine automatically, and the capacity of the washer is about 75 tons per day. At present the men are working only 12 hours a day, but next week there will be day and night shifts, thus running it all the time, and more than doubling the present run. It is claimed that this machine saves about \$1.50 per ton over the former process, and costs \$15 per day to run it. Work on the new reservoir is progressing very nicely, and by New Year's hydraulic can commence. The production of the Cora Belle has revived much interest in mining in this district.

Monterey.

LOS BURROS MINES.—Cor. Monterey *Democrat*, Nov. 11: Of all the resources of the county, for immediate possibilities, nothing impressed me so favorably as Los Burros mines. The mines give every evidence of millions awaiting a little well-directed industry and the judicious expenditure of a comparatively small amount of capital. If these mines are not as rich as anything that has ever been found on the Pacific Coast, there is nothing in indications. The writer accompanied Supervisor Pinkerton into the mines, driving from Pleyto, via Jolon, to the station on the Nacimiento river at the foot of the mountains. This is the end of the wagon-road and 12 miles from the mines. Next morning we bestrode our horses and started up the trail. The trail is better than the average of mountain trails, and was constructed by the county at an expense of \$300, but the mountains are rough. A short distance down a canyon, toward the ocean, we found the mining camp, the town of Manchester, 8 or 10 houses built of logs and split lumber. Three saloons are conspicuous and well patronized. There is a store and hotel, and about 100 people at the camp, including three or four families. The mining district comprises eight square miles, upon which have been located not less than 500 claims. Of these, the first mine, discovered on the 24th of March, 1887, by Wm. Cruikshank, is the only one that any great quantity of ore has been taken from, although there are other mines which not only prospect well but have a large quantity of rich ore in sight. The discovery of these mines was the result of long and persistent prospecting. Placer gold and float quartz have been found all through this country for years, and Mr. Cruikshank's faith in a ledge has been rewarded by one of the richest discoveries ever made in the State. The ledge was discovered in the head of the canyon, and from the surface is very rich, showing free gold and assaying from \$150 to \$8000 per ton. The quartz vein is about three feet thick, with clearly defined footwalls, running east and west, and dipping north 45 degrees. Mr. Cruikshank has a three-stamp mill, and has taken out a snug sum. Not long since he started a tunnel which would tap the vein at a depth of 125 feet. This tunnel, at a distance of 380 feet, reached the vein and found it just as rich as at the surface. But this is not all. In the tunnel several stringers, from 6 to 18 inches in thickness, were cut, and they are as rich as the main vein. This tunnel has demonstrated two things: The permanency and richness of the prospect, and that the mountains in this vicinity are full of small gold-bearing quartz veins. In the Cruikshank mine there is enough in sight to make its owner a millionaire, with the prospect of ore of a similar quality to the ocean level, 3500 feet. Good prospects have been found over eight square miles of territory, and the ledge has been struck at a number of places, demonstrating that the precious mineral is pretty well distributed over the district. A tunnel in the Brewery mine has struck the ledge and struck it rich. The strike was made the day before our arrival. In the King mine a tunnel is being pushed with good prospects. The Bradley company has some fine prospects. The Grand Pacific adjoins the Cruikshank, and is undoubtedly very rich. But aside from the Cruikshank mine not very much work has been done. People have waited to see what would be found on the lower level, and as this strike has only recently been made, there has not since been time enough to make any further developments. But the miners are feeling jubilant and

anticipate a lively camp next spring. There are more than 20 claims that have been prospected and show up well. Nuggets have been found weighing from 10 cents to \$14. The children find gold in the gulches. There is no rebellious ore, and much of the gold has been found in decomposed quartz. My surprise in finding a camp with such prospects in this locality was not so great as it was to find so few people, comparatively speaking. Why it is that such prospects as are at Los Burros have not attracted thousands of people is more than I can understand. But one thing is certain, it will not be long before the resources of this camp will be so developed and advertised as to make it conspicuous among the best mines of the coast.

Nevada.

DEEP MINING.—*Tidings*, Nov. 8: The Mountaineer mine of Nevada district is to be given depth. It has been a profitable property, but like the other mines of its district has failed to pay after attaining a certain depth. Now sinking is to be resumed and continued until it is reasonably demonstrated whether or not good ore exists below the strata. What has been achieved in the Grass Valley district through deep sinking may be achieved in our sister district. Deep mining for quartz has in the last eight years resulted in the unearthing of millions of gold in the small area known as the Grass Valley Mining District.

CAVE AT THE MANZANITA.—*Transcript*, Nov. 8: There was a bad cave Tuesday evening of the hydraulic bank at the Manzanita gravel claim in the northern part of this city. An immense amount of debris slid down nearly to the mouth of the drifting tunnel through which the channel is now being worked. The tunnel opening is some 700 feet from the original foot of the bank, which is 400 feet high. By the cave a portion of the tunnel was broken down and about 40 men are temporarily thrown out of employment.

GOOD ROCK.—*Herald*, Nov. 5: The men working at the El Dorado mine report finding good rock in the drift being run on the ledge from the main tunnel. This ledge was thought to be a parallel one to the main ledge for which they have been running. It has widened out in the drift, which is now in 16 feet, to 18 inches. The news is very encouraging and gives the owners some consolation for all the disappointments and delays they have experienced. But the company are stayers and will yet develop a valuable mine.

WHY IT WAS CLOSED DOWN.—*Herald*, Nov. 7: The rock in the Washington mine is said to be looking better than ever, and the ledge at the bottom is of increased size, but in November and December, where the mill is located, a good deal of ice forms around the large overshot wheel, and the gold being fine, does not amalgamate as well as in the warmer weather. So as there is development work to be done, it was thought advisable to do it and stop crushing for a time.

THE BRUNSWICK MINE.—*Transcript*, Nov. 10: Mr. Murray of New York, representing the Brunswick G. M. Co., was in this city yesterday settling up the judgments lately obtained against the company by Edwin Tilley and H. Silvester. These amounted to about \$2300, including costs. Mr. Murray thinks his company will resume operations at an early day.

COE MINE.—*Grass Valley Union*, Nov. 11: An agreement has been made by the owners of the Coe mine with the agent of Eastern parties to bond the property, with the privilege of its ultimate purchase. All the terms have been agreed upon, and it is expected that in a few weeks operations at the mine will be resumed.

Shasta.

IRON MOUNTAIN.—Shasta *Courier*, Nov. 10: The Lost Confidence mill and reduction works will start up next Monday, all needed repairs having been made, a large supply of fuel procured, and any quantity of good milling ore out ready for reduction. The second shipment of ore from the Little Nellie mine, Iron Mountain district, was made last week, the ore assaying splendidly. Mr. Everett, the superintendent, is very sanguine over the prospects and workings of the mine, and the impression is general that Deputy Sheriff Buckley of Sacramento made a good investment when he purchased the mine a few months ago from Oliver Boyd. The work of running a tunnel to tap the ledge on the Dow & Haskell mine is steadily progressing, and we expect to soon hear of the ledge being tapped at a depth from the surface that will make the taking out of an immense quantity of good milling ore an easy and comparatively inexpensive task. We are informed that the developments in the Little Nellie mine and the bullion yield from the quartz has led the owner to determine to put up a mill as soon as possible, and thereby save the expense of shipping ore.

WATER-POWER.—*Redding Free Press*, Nov. 9: The advantage of water-power over that of steam is now proved conclusively in the Calumet mine, about six miles above here, its capacity being increased nearly double, and the steadiness of the motor causing a great saving in wear and tear of the machinery. The bridge suspended across the Sacramento river, upon which the immense pipe is laid which conveys the water from Spring creek to the mill, is not only noticeable for strength and beauty, but for its advantage to the neighborhood, it being constructed in such a manner as to be used as a foot bridge with perfect safety.

Siskiyou.

QUARTZ.—Yreka *Journal*, Nov. 7: Mr. Charles Abbott of Greenhorn Creek will soon commence hauling quartz to Warren's mill on Yreka Flats for crushing. He has nearly 20 tons of rich-looking quartz, some of which shows a great quantity of gold to the naked eye. He has pounded out enough all summer in a mortar to pay expenses, and if the rock averages anything near the prospects realized, he will make quite a stake. Heckathorn & Co., who also have a rich ledge on Greenhorn, are now building an arastra, which they expect to use in crushing quartz on hand as soon as the winter storms commence to supply sufficient water. Rich mines of gold and silver are reported as having been discovered in the mountains west of Edgewood, and it is probable that good-paying mines exist in the dividing range of mountains between Shasta and Scott valleys, all the way from Yreka to Mount Shasta. Jo Cavanaugh of Edgewood showed us a fine specimen of galena found in the hills west of Edgewood, which is rich. Several specimens of this ore have been found, and it is believed good ledges exist, for which he has men out prospecting. It is also re-

NEVADA.

Washoe District.

SEGREGATED BELCHER.—Virginia *Enterprise*, Nov. 10: The 1100 station is now repaired and are ready to start the joint east drift as soon as they can get the rope down in the incline.

BEST AND BELCHER.—300 level.—In west crosscut No. 1, at a distance of 120 feet from main north-west drift, the winze has been sunk 23 feet. Total depth, 45 feet. Formation, quartz and porphyry, showing some value. From the bottom of the winze a south drift has been started and advanced 12 feet. Formation, quartz and porphyry, showing some value. South drift from top of winze has been extended 11 feet. Total length, 40 feet. Formation, porphyry. 625 level, main north drift, has been cleaned out and repaired a distance of 525 feet.

HALE AND NORCROSS.—On the 500 level the west drift has been advanced 15 feet; total distance, 545 feet. The north drift has been extended 30 feet; total distance, 160 feet. The north and south prospecting drifts from the 15th floor have been advanced respectively 20 and 18 feet. On the 800 level the north drift has been advanced 22 feet and the south drift 40 feet. Have men on repairs in the shaft stations and on the several levels of the mine, and are preparing to resume shortly the extraction of ore.

SAVAGE.—On the 400 level the southeast and northeast drifts have been advanced respectively 20 feet. From the north and south drifts on this level are stopping ore. On the 500 level are stopping ore of good quality from the east crosscut. Car samples average \$45 per ton. No. 2 east crosscut on this level has been advanced 24 feet. On the 950 level the east crosscut has been advanced 20 feet, and has broken into the old stopes. From the several levels are extracting about 60 tons of ore per day. Shipped in bullion this week \$7775.33.

GOULD AND CURRY.—200 level.—West crosscut from the top of the upraise from El Dorado (300) level has been extended 16 feet; total length, 114 feet. Formation, quartz and porphyry, giving high assays. 450 level.—At a point 60 feet from top of upraise, from the 500 level, a west crosscut has been advanced 30 feet. Formation, clay and porphyry.

BELCHER.—The 200 north drift is now in 126 feet, having been advanced 24 feet during the week. The 160 south drift to meet it was advanced 15 feet. Repairs to the pump compartment are progressing satisfactorily. Will get the rope in the incline in a few days, when the 1100 joint east drift can be advanced.

CHOLLAR.—The west drift from the shaft on the 850 level is in 66 feet; the face is in quartz and clay. The west drift from the shaft, 750 level, is in 217 feet. The face is in porphyry. The north drift, 450 level, is in 712 feet; the face is in quartz of no value.

BALTIMORE.—Have considerable good ore on the dump, extracted from the northwest and southwest drifts on the 300 level. Everything is working well, and hopes are entertained of striking a good body of ore.

ALPHA.—The 500 level north lateral drift is in the north of the shaft 155 feet; the face is in quartz and clay. The south drift, same level, is in 68 feet; the face is in quartz that yields assays from \$10 to \$30 a ton.

CROWN POINT.—The south crosscut (No. 2 west, 700 level) has not been advanced, the week having been occupied in retimbering and cutting a drain. Started the drift on the 800 level Wednesday.

ALTA.—The work of development of the ore body struck on the 900 level is progressing fast. The 825 level is yielding its usual quantity of ore, which is being concentrated at the mill.

POTOSI.—The south drift, 65 level, is in 558 feet; the face is in quartz and porphyry. The east crosscut No. 2, 650 level, is in 65 feet; the face is in quartz, some of which yields good assays.

EXCHEQUER.—The north lateral drift, 372 level, is in 492 feet. The face is in porphyry. The east crosscut, 200 feet north of the south line, is in 17 feet; face in clay and porphyry.

SCORPION.—No change to report in the progress of work in this mine. Are still crosscutting west on 300 level.

JUSTICE.—Work on the new mill progressing satisfactorily. Ore reserves continue to look well.

ANDES.—Running the north lateral drift on the 350 level, and sinking winze on the 240 level.

YELLOW JACKET.—Shipping white rock gold-bearing ore to the Brunswick as formerly.

BULLION.—There is nothing new to report in the work on the 500 and 600 levels.

OVERMAN.—Prospecting below the tunnel level continues.

KEYSTONE.—Drifting southwesterly on the 300 level.

Eureka District.

BULLION AND LEAD.—Eureka *Sentinel*, Nov. 10: During the week the Richmond Company has shipped 60 tons of silver-lead bullion, and the Eureka Con. Company has shipped 15 tons of lead.

ORE SHIPMENTS.—During the last week ore shipments were made from the following-named mines of the district to the furnaces: From the Hamburg mine, 94½ tons; Jackson, 134 tons; Dunderberg, 88½ tons; Paymaster, 3¼ tons; Climax, 4½ tons; and the Ethel, 1 ton.

Pioche District.

YUBA.—Eureka *Sentinel*, Nov. 10: The Yuba mine employs 30 men and continues regular shipments of high-grade ore. The work on the mine is mainly exploratory, the main bulk of the ore being left in the mine for better facilities which the railroad will bring.

Tuscarora District.

GRAND PRIZE.—*Times-Review*, Nov. 9: The water is now down to within a distance of 13 feet of the floor of the 400-foot level station.

COMMONWEALTH.—100-foot level: Upraise from west drift has been carried up 70 feet in vein matter showing some ore. No. 1 winze from east lateral drift has been sunk 8 feet through hard rock with

seams of ore mixed through. North drift from joint crosscut has been advanced 15 feet. Intermediate drift from top of No. 4 chute has been extended 12 feet. 150-foot level: No. 2 winze from east lateral drift has been sunk 6 feet. Work at this point has been suspended until crosscut can be run from 225-foot level. Upraise from No. 3 north drift has been extended up 20 feet, all in vein matter. 225-foot level: Main south drift has been advanced 14 feet.

NEVADA QUEEN.—No. 1 north drift, 450-foot level, has been advanced 10 feet in vein matter showing some sulphurets. The stopes above the 350-foot level have yielded the usual amount, but stoping has been suspended, as the mill has to be turned over to the Navajo company on Monday, 12th, and is being cleaned up. Prospect work will be resumed at various points throughout the mine. Will ship bullion from cleanup on Monday.

NAVAGO.—South drift from east crosscut on west vein, 350-foot level, has been extended 12 feet. South drift from No. 4 crosscut, same level, advanced 12 feet. The usual progress has been made in all the other workings. The force in the stopes has been increased during the week, and the extracting of ore for milling has been commenced. The stopes are looking well at all points. Commence milling Monday.

NORTH BELLE ISLE.—East crosscut, 300-foot level has made fair progress. South intermediate drift from No. 1 winze, 300-foot level, advanced four feet. The face shows about two feet of concentrating ore. Crosscut west, 400-foot level, extended ten feet; total length 18 feet. Some work has been done in the stopes above the 400-foot level. The work on the Union mill is progressing rapidly.

NORTH COMMONWEALTH AND DEL MONTE COMBINATION SHAFT.—Sinking has been suspended pending the erection of the hoisting works. Excavation for the foundation of the engine is completed. Work on the building will be pushed rapidly.

BELLE ISLE.—East crosscut from north drift, 250-foot level, has been extended 14 feet; total length, 230 feet.

FOUND TREASURE.—The timbers in east drift, 150-foot level, are being cased and many of the old timbers are being replaced by new.

ARIZONA.

DIFFERENT DISTRICTS.—Prescott *Courier*, Nov. 7: John Hutchins, Hughey Hughes, Geo. Burton and other miners of Groom creek were in Prescott yesterday. Most of the miners of the district are taking out good ore. Jones' mill will start on another run in a few days. Dan O'Boyle, owner of the Montgomery group of mines, continues to get good pay out of his ore in an arastra. Frank Kuhne is shipping about 100 tons of ore a month from the Belle mine, Walker district. It pays well in gold. Mr. Thompson, superintendent of the United Verde mines and smelters, has been examining properties south of Prescott. His mines and smelters are O. K. Geo. Zika has ore en route to the Ore Co.'s works from his mine in Lower Turkey creek. Geo. Wickler has a shipment ready at his White Spar mine. Frank Alters would be happy if he could get a pack train to bring in rich ore from the Catacino mine. He has "dead loads" of it. Messrs. Dunkle & Fisher have erected new hoisting works on their mine in Turkey creek district, and will now prospect it to a great depth. Geo. B. Ridenour is shipping good ore from the Delta mine, Hassayampa district. Holliday & Co. will shortly ship a big lot of rich ore from the Dosoris. John McDermid says placer miners of Lynx creek are taking advantage of the water and are washing considerable gold out of the gravel.

NICKEL MINE.—Phoenix *Herald*, Nov. 3: Billy Everett, who has been out in Tonto Basin for several months, returned this morning the happy possessor of a large and valuable nickel mine, which he discovered on the very summit of the Sierra Ancha. He has already received returns from Prof. Dewey of the Smithsonian Institute, to whom he sent some samples, informing him that the ores contain nickel, cobalt and bismuth. To-day he shipped by request 20 pounds of ore to the same professor, who will return him a perfect analysis of the contents. The ledge is six feet in width. Frank Kline of Tonto has claimed an extension.

COLORADO.

WINTER WORK.—Elk Mountain *Pilot*, Nov. 11: It is too bad that the Eastern people interested in our country do not commence early enough in the fall to make preparations for winter work. They are too apt to put it off too late. Mine work can be carried on to a better advantage in winter. The Runoee boys have struck some fine ore on Galena mountain. The Anthracite mine is again running on full time, we believe. The Copper Queen mine, in Silver Queen basin, will be worked all winter by Jake Goodwin. The development will be in driving the tunnel ahead under the ore chute. The tunnel is now about 200 feet long and will have to be driven from 75 to 100 feet before the vein is cut. The ore on the surface is gray copper, different from anything ever before found in the country, and will run from 25 to 35 per cent copper and about 200 ounces in silver. Supplies are being put in at the Shakespear mine for about four men to work all winter. Jerry Madden has completed a new house on his claim, and is getting ready to work all winter. He has a good showing on his claim, situated in Bonanza gulch. Messrs. McGulloch and Cameron are over in Dark canyon working the assessment on the St. Elmo lode. Mr. Ger expects them out any day, and as they are not supplied with snow shoes he had to send J. C. McQuarrie over with snow shoes in order that they can come out.

ZINC.—Georgetown *Courier*, Nov. 9: A new company for the mining, buying and reduction of zinc ores has been organized in Denver.

CONCENTRATORS.—Harzlet & Co. have been overhauling and remodeling their concentrating works preparatory to winter work. They have so arranged their works that nearly everything is done automatically, hence cheaply. The ore passes through two crushers and the coarser material from the second crusher goes under the stamps, all of which is carried by buckets to the concentrating tables. About 10 tons of ore are concentrated each day, and the results are highly satisfactory. We hope to see the entire Clear Creek mill converted in-

to concentrating works next summer. Capital, with the practical experience of those engaged in this enterprise to back it, would be well invested in such a scheme.

GOLD.—Clear Creek county deposited \$9006.29 in gold at the Denver mint during the month of October. Zorquite, a mineral composed of selenium, lead and copper, is found in the Pearl lode, San Juan county. The Whiting mine at Central recently had a gold brick cast at the Denver mint, valued at \$39,219.91 in gold and \$362.54 in silver. A mill-run of ore from the Cashier lode near Argentine pass, returned 145 ounces silver per ton and 13 per cent lead. The Cashier is owned by J. P. Williams. The 800-foot adit on the Queen, Argentine pass, is being driven ahead for the purpose of connecting with the shaft for ventilation and opening ground containing their best ore.

NATIVE SILVER.—Considerable native silver was struck in the Washington lode, Silver Creek, last Saturday. The vein shows a large streak of quartz liberally mineralized, which is believed to be paying ore. The lode is being worked by Bond, Johnson & Maxwell. Following is the statement of ore sampled and sold at the public ore market during the three months ending Oct. 31: 1,966,800 pounds, containing 282 ounces gold, 117,810 ounces silver, 126,398 pounds lead, 4066 pounds copper. Total assay value, \$122,181.

DAKOTA.

GALENA SMELTER.—Deadwood *Pioneer*, Nov. 6: The long-looked-for coke has at length arrived and fires were last night started in furnaces of the galena smelter. Ore will be put through this morning, and by night the first bullion will have been produced. The bins are full of ore received from the Queen, Horseshoe, Bullion, Ontario, Hayes and other properties. An experienced miner in the city yesterday expressed the belief that the smelter will have a successful career. It is in the hands of practical men, thoroughly acquainted with the resources of the camp, who had carefully weighed the question before deciding to start the plant up. The mines are capable of furnishing twice the quantity of ore required to keep the plant running, and doubtless it will not be long after this is demonstrated a success before another and larger smelter is put up.

SILVER PLUMAS.—The Silver Plumas name must be added to the list of companies producing gold bullion with monthly regularity. Operating only a 20-stamp mill, the September cleanup amounted to \$7800. That for October is even better than this. Supt. David Hunter came down yesterday, bringing with him two bricks valued at \$8000 and representing operations for only 20 days of last month. The amount is flattering, all things considered, and indicates that the ore treated must be rather higher in grade than the average on the belt.

FLOAT.—Bullion from the belt mines, aggregating in value about \$150,000 and representing cleanup for the last two weeks of October, was brought down yesterday and deposited in Wells, Fargo's express office for shipment East to-day.

IDAHO.

FLORIDA MOUNTAIN.—Idaho *Avalanche*, Nov. 7: W. H. Dewey is working quite a number of men on the Back Jack mine, on Florida mountain. This property should be in the hands of men able to put up a 100-stamp mill. Men who know the several properties owned by Mr. Dewey best, and who have walked through the 7000 or 8000 feet of tunnels in the group, all agree that there are enough tons of good ore in sight to keep such a mill running for years. Mark you, Silver City has not seen her best day. The two mountains which obscure the rising and setting sun from the town are storehouses holding a surplus, which, if it were the "condition to confront" by the Government, would make the reduction proposed by the Mills and Senate bills look insignificant.

ROTTEN GRANITE.—The little "Granite Quarry," near the Morning Star mine, recently discovered by Geo. Stoddard, is an anomaly to miners. It is a series of very rich stringers in rotten granite. These stringers are from half an inch to two inches wide, and there is upward of 100 of these in a distance of about 30 feet. By assorting close he takes out about 500 pounds of ore per day, worth about \$125 per ton. He works it alone, but it looks like it will last, in fact is daily growing better. It promises to be a big mine, and all of George's friends, which means everybody who knows him, hope it will prove all that it promises.

SILVER CITY.—Idaho *Avalanche*, Nov. 8: Anticipating a big output from the mines on War Eagle and Florida mountains this coming winter, all freight haulers are laying in larger supplies of hay and grain than have been brought to town for many years; our merchants are purchasing bigger stocks of goods; the mine boarding bosses are piling up unusual amounts of supplies, and the woodpiles at every mill are bigger than they have been since they were built. These facts are mentioned to show that our own people have faith in the continuation of the prosperity which now makes Silver City happy.

ORO FINO.—The Oro Fino rich strike continues rich as they drift into the chute of ore. There is every reason to believe that it will prove to be 400 feet long, with a good deal more than a million profit in it. The Poorman people have contracted with the arastra mill for the crushing of enough ore to keep the mill running night and day until the robins come again, and are sure they have enough ore in sight to keep up a steady gait for a year at least.

MINERS.—Several new miners arrived in the camp this week and found work at once. It is not a gracious thing to state in a paper with so wide a circulation as the *Avalanche* that more miners are needed, because we are a long distance from other mining camps and may cause more to come than can find work. Nevertheless quite a number more than now here could find work at once.

MONTANA.

COKE AND COAL INDUSTRY.—Bozeman *Courier*, Nov. 6: The business of manufacturing coke at Cokedale is developing into quite an industry. Work has commenced on 13 new ovens, which, when completed, will make a total of 40. These turn out an

average of a ton of coke a day. The ovens are built to take charges of five tons each, and the coal is allowed to burn 72 hours. Coke can be made in less time—considerable having been made by burning the coal 48 hours—but it has been found that the coke made in 72 hours, where a lighter draft is used, is of superior quality. About 100 men are now on the pay-roll of the company. A test of the Horrocks coal has been made at the Cokedale ovens and has made coke of excellent quality. It is rumored that the entire output of the 11 or 12 mines will be taken by the Helena and Livingston Smelting Co., part of it being made into coke at Cokedale. The seam of coal at the Chestnut mine, which is now being worked by Frank Esler, is 11 feet in thickness and the coal comes out in large pieces. That used by persons in the city is said to be superior to any heretofore received from that mine and gives very general satisfaction.

GRANITE MOUNTAIN.—Phillipsburg *Mail*, Nov. 7: The output for the week ending Nov. 7, was 36 bars of bullion, containing 55,550 ounces silver and 22,26 ounces gold. The small output this week was occasioned by the shut-down of mill A for two days during the week.

ROCK CREEK DISTRICT.—This is a mining district about 16 miles from Phillipsburg, which, outside of a few cases, is practically unprospected. The exceptions are certainly few, but the result seems to have been flattering to the few who have had the hardihood and confidence to explore and prospect that rugged and rich mineral country. The district lies between Rock and Willow creeks, and is about as rugged and uninviting a country as a person would be likely to see anywhere. The ledges are quite rich and very extensive and are just beginning to attract some attention.

DORA THORNE.—While little is being said about this property, work is going on with all possible rapidity. Sinking on the Little Turf is making good progress and is improving as they go down. They now have seven men at work and will put on more as the mine is opened up.

SYDNEY CONSOLIDATED.—The Sydney follows suit with the many other mines that have been reported lately as making valuable discoveries. Last week a new iron vein was struck in this mine which will greatly add to its value.

NEW MEXICO.

TAILINGS.—Silver City *Enterprise*, Nov. 9: C. P. Crawford is engaged in concentrating the tailings at the Mimbre mill after they have been run through the concentrators a couple of times. He is doing very well; saving several ounces of silver to the ton. The returns of the last shipment of Black Hawk ore were received last week by McQuarrie & McGregor. It ran very well and was treated at the El Paso smelter. The Black Hawk, worked by such level-headed, practical miners as the present leasers, is bound to make a good showing. P. Stewart, manager at Telegraph, was in town last week on his way East, where he expects to remain about two weeks. He stated the mines were looking better than at any time since work was commenced upon these claims. Splendid-grade ore has again been struck in the Tescumseh tunnel at 250 feet, and stoping will be resorted to to get enough out to keep the mill running. Telegraph is yet liable to forge to the front. John A. Miller is reported to have invented an ore-concentrator that when put in operation will be generally adopted in mills having rebellious ores to treat. Mr. Miller is in the East at present engaged in perfecting arrangements for the manufacture of his concentrator and the organization of a company to introduce and build them.

OREGON.

CORNUCOPIA.—Cor. Union *Republican*, Nov. 7: With the excitement about and around, over mining camps starting up in all Eastern Oregon, each with its peculiar advantages, one almost loses sight of Cornucopia. Not that it has passed its usefulness or that it is less important or lacks that grand equivalent, the most desired mineral. But the excitement and visionary has given way for the sober, thoughtful and substantial. That we have ore here in large and lasting quantities is shown more and more by each foot of depth attained, and that it improves with depth has been proved at least to some 400 feet. That the ore is of paying quality, the great question on which the continuance of all operations is based, has been shown by the work at the Eagle mill, the property of the Oregon G. M. Co., of Louisville, Ky., under the supervision of Mr. A. E. Smith. I left Cornucopia some time ago as quiet, dull and unpromising as you could well imagine, and after a somewhat informal journey, I visited many of the now "bouncing" mining camps of Eastern Oregon, all of which are in their first excitement, their substantial qualities only visionary, many very promising, others dull; but on my return here I find a change has come to Cornucopia. I can now hear the roar of the 20 stamps at the Eagle mill, which seem to say again and again, "One thousand dollars a day," the screech and grit of the ore-wagon coming down the grade with its loads of four tons of fine ore for the mill and back for more, a general liveliness about everything and every one that helps his confidence amazingly. Not only is this stir confined to the O. G. M. Co. but I could mention many properties that are exceeding expectation. A very careful and thorough examination of the mines of the basin is being made on behalf of some capitalists of the Northern Pacific railroad.

EASTERN OREGON COAL MINES.—Bedrock *Democrat*, Nov. 7: Work is going on apace at the Dry Hollow coal mines on John Day river, near Fossil, under the supervision of the superintendent, C. S. Miller. Messrs. Peterson & Panning are engaged on the work. They have excavated quite a considerable distance under ground, and are following up the different ledges with the most sanguine expectations of striking coal in large quantities. The coal taken out is of very excellent quality, representing what is known as the Kendal coal, found in the North of England, and is suitable for almost any purpose. It burns well in stoves, and throws out a strong body of heat.

SOLD HIS INTEREST.—An important transfer of an interest in the Worley mine, near Robinsonville, took place last week, by which Mr. L. H. Bowman of Walla Walla secures the interest of Andrew Hamilton and pays therefor a consideration of about \$3000; part cash, the balance in three-year-old

mares, the pick of a band of 300. Messrs. Hamilton & Bowman are now in Walla Walla closing up the bargain. This makes Mr. Bowman an equal owner in the mine with W. J. Wolfe and puts the property in shape for permanent operations in future. Already these preparations have been made and several teams loaded with freight and supplies for the mine are now on the way. Work will be pushed all winter, and in the spring it will be determined whether or not to put up a mill of sufficient capacity for successful working of the ore.

THE ELKHORN.—The Elkhorn mine is an extension of the well-known Baisley Bros. mine, situated about 15 miles west of this city. It is owned by J. H. Robbins & Son of Portland, who have had a force of men developing the property for the past year until now it gives every promise of being a valuable and permanent mine. We learn from one of the owners that it is their intention to ship one or more carloads of the ore the coming week to Denver for reduction, and if satisfactory results are obtained, of which they are certain, they will continue shipping until the snows of winter put in an objection. In the spring a mill will be placed on the property and the owners feel confident they will obtain handsome results.

UTAH.

CAR FORK, BINGHAM.—Salt Lake *Tribune*, Nov. 11: Car Fork, Bingham, is coming to the front through work being done by the Stewart No. 2 Co., together with operations of the Last Chance Co. The Stewart No. 2 put in some Huntington mills last spring to crush their gold rock, and the machinery is working satisfactorily. There is an unlimited amount of free gold ore, in such a large mass as to be mined as easily as quarrying line rock. There are some sulphurets present in this ore, but it is so free as to be economically worked, and is so far above the mill as to be dropped into it at a very small cost of mining and delivery to the crushers. About 2000 feet up the gulch from the Stewart property is the mouth of the British Tunnel, which has been driven 2700 feet to tap the Last Chance lode at a depth of 1000 feet, where it intercepts the main shaft. This is a fine working tunnel which cost the company something over \$40,000. Besides giving exit for ore and waste from the mine, this tunnel drains the property, besides a large space of country around, sending out a stream of fine, pure water. The Last Chance was opened in 1871, and has been worked more or less ever since. It has produced about \$1,000,000 from a short space of ground, above the 500-foot level. The mine has six levels down to and including the 500-foot level, and has been worked through the main shaft and the two crosscut tunnels, one at 250 and the other intersecting the 500-foot level. These crosscut tunnels are, respectively, 250 and 900 feet long. This lode is a typical one for Bingham, being in syenite, regular in its course and dip, its general trend being northeast and southwest, with a dip of 40 degrees from vertical, toward the southeast. The lode has been opened continuously on the Hooper, Last Chance, Northern Last Chance and Steamboat, a distance of nearly one mile. The ore runs from 30 to 100 ounces silver, 18 to 40 per cent lead and \$5 to \$20 in gold, the average being about \$50 per ton in market value. It varies in width from 10 to 50 feet. The Last Chance Co. lately contracted with the Utah & Montana Machinery Co. for a complete crushing and concentrating mill with a capacity of 50 to 60 tons per day, and this mill will be ready to turn on steam by the last of this week. The mill is located at the mouth of the tunnel, where, as has already been stated, there is an abundance of water. This property belongs to an English company with George Cullen as local director and manager. A mining force has just been put in the mine on the tunnel or 1000-foot level to extract ore to supply the mill. The company was reorganized this season, when the name of the company was changed from Last Chance to the New Chance Mining Co., Limited, but this does not change the name of the mine which has so long been a landmark in Bingham. When this change was made the capital stock was increased and money raised to put up the mill and make developments, thus placing the company and property in excellent condition.

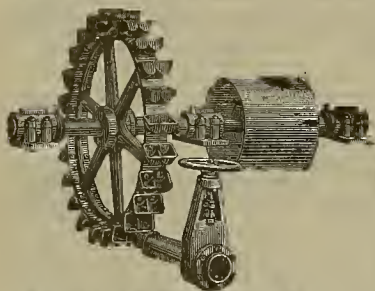
PARK NOTES.—Record, Nov. 10: Most of the mining companies paid off this week. Ontario stock is held at \$31.50 to \$32 per share; Daly, \$16.25; Anchor, \$5.50; Southern Tier, 75 cents; Crescent, 35 cents; Apex, 30 cents. The stock market is quiet and inactive now. The two cases of P. F. Brennan et al. vs. Nalley Moray et al. were decided in the Third District Court, Thursday. The action involved title to mining ground in and near the Putnam group, and findings and decree were for the plaintiffs. At the sale of the late Jas. H. Bowen's mining claims, John H. Rogers was the highest bidder. The locations were almost without number and nearly all were "jumpable." The sum paid was \$25 for a fraction of a claim, and all of the balance of the locations went as nothing. Assessment and development work is being done on the Berry & Dorsetta claim, owned mainly by Jas. Berry and P. F. Brennan. The property is on the ridge between the Anchor and Sampson. The tunnel is in 30 feet southward. It will be continued in the hope that the present favorable indications may lead up to the vein.

ORE AND BULLION SHIPMENTS.—During the week the Crescent shipped 193,000 pounds of concentrates. For the week just ended the Mackintosh sampler received 196,350 pounds of Ontario ore, 117,520 of Woodside lease, and 86,510 of Daly ore; total, 400,380. Last Tuesday, 12 bars of Daly bullion, 10,461 fine ounces of silver, were shipped from the Marsac mill.

WASHINGTON.

SILVER.—Spokane Valley *Herald*, Nov. 7: A short time since a discovery of what gave promise of being an important and valuable silver ledge was accidentally discovered in a railroad cut near the fair grounds by a party who was looking around the cut. He kept the matter quiet and sent to Montana for a mining friend who arrived a few days ago and prospect the discovery. The ledge is said to be five feet wide and 20 feet deep, assaying 37 ounces of silver to the ton. Local parties are interested in the development of the claim who have had considerable mining experience, and who have some idea of what they are doing, and it would not be at all surprising if this ledge proved to be a rich find.

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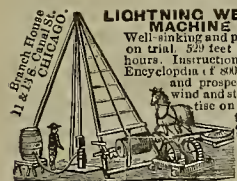
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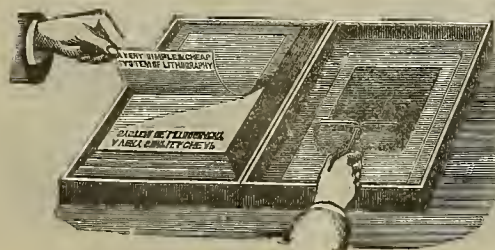
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SQUARE FLAX PACKING.

Manufactured from strictly first-class Flax and pure lubricants. Superior to all others for Water and Steam. Packs with less friction and makes a tighter joint than any other packing made. As imitations of inferior quality having been put upon the market, we have been compelled to adopt the above trade-mark, and all of our packing will now have a RED CORD running through the center its entire length. See that you get it and take no other. Sold by all Hardware dealers. Price, 50 cents per pound. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

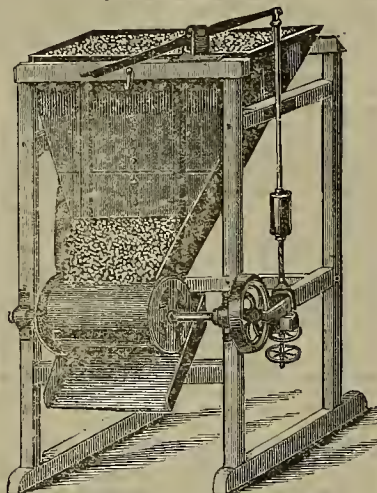
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THE ROLLER ORE FEEDER

(Patented May 28, 1882)



This is the best and cheapest Ore Feeder now in use. It has fewer parts, requires less power, is simpler in adjustment than any other. Feeds coarse ore or soft clay alike uniformly, under one or all the stamps in a battery as required.

In the Bunker Hill Mill it has run continuously for two years, never having been out of order or costing a dollar for repairs.

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Sole Manufacturers,
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TO ALL INTERESTED IN THE USE OF

COMPRESSED AIR.

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ROCK DRILLS,

And General Mining Machinery.

This Catalogue gives a full description of the Patented Improvements embraced in these unrivalled Air Compressors, together with tables, data, etc., of value to users of compressed air.

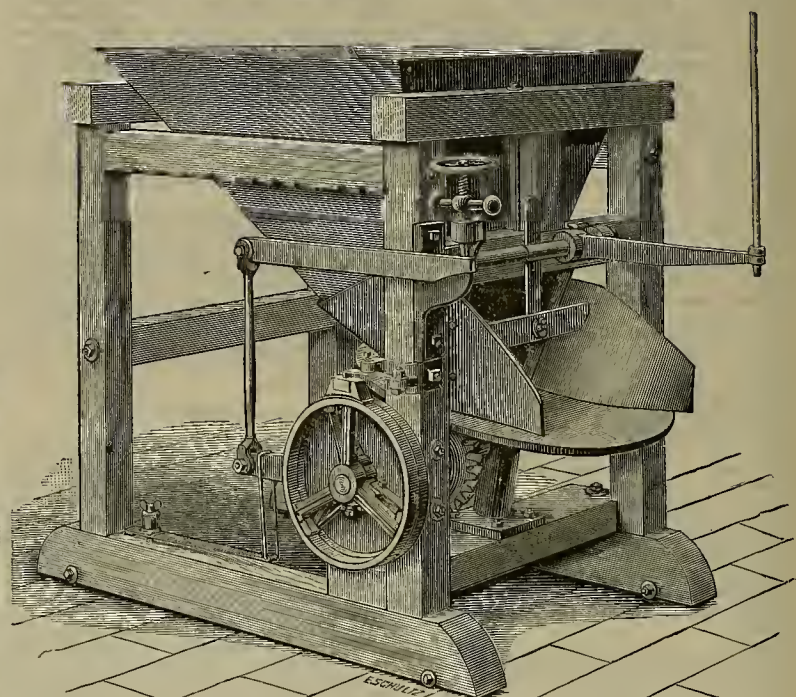
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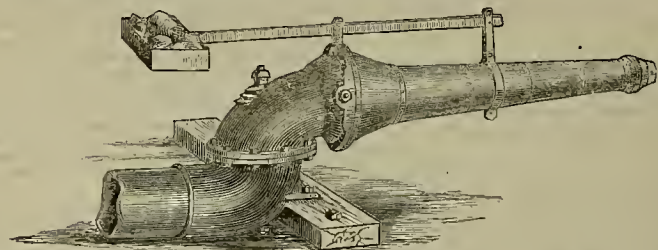
The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz.:

N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. | D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.

WE ARE MANUFACTURERS OF THE

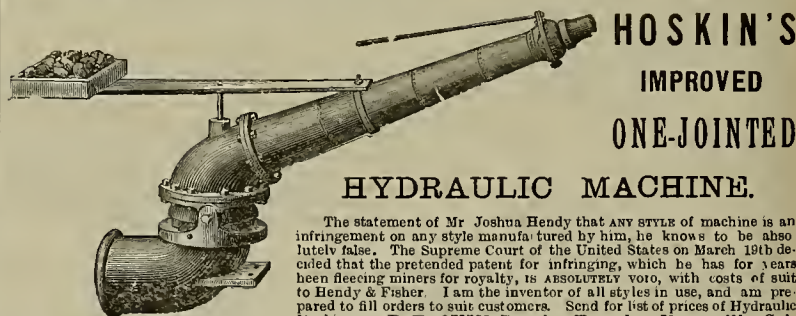
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And will furnish descriptive Catalogues and quote prices upon application.

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THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

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IMPROVED
ONE-JOINTED

HYDRAULIC MACHINE.

The statement of Mr. Joshua Hendy that any style of machine is an infringement on any style manufactured by him, he knows to be absolutely false. The Supreme Court of the United States on March 19th decided that the pretended patent for infringing, which he has for years been fleecing miners for royalty, is absolutely void, with costs of suit to Hendy & Fisher. I am the inventor of all styles in use, and am prepared to fill orders to suit customers. Send for list of prices of Hydraulic Machinery. R. HOSKIN, Empire Foundry, Marysville, Cal.

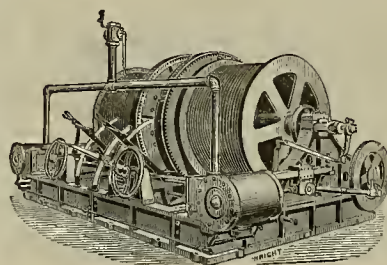
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FOR MINES.

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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PACIFIC COAST AGENTS,
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STURTEVANT MILL.

This Mill as a Crusher and Pulverizer is without rival.
Is in operation in each
ing smelting works
and mills.

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MACHINERY for SYSTEMATIC MILLING, SMELTING, and CONCENTRATION of ORES.**PUMPING****ENGINES**

—AND—

MACHINERY,**CORNISH****PUMPS.**

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**GOLD AND SILVER REFINERY
And Assay Office.**

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

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BLUESTONE**LEAD PIPE,****SHEET LEAD,****SHOT, Etc., Etc.**

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlin Patent.**JOHN TAYLOR & CO.,**

IMPORTERS AND DEALERS IN

**ASSAYERS' MATERIALS, MINE
AND MILL SUPPLIES,****ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND
CHEMICAL APPARATUS.**

63 & 65 First St., cor. Mission, San Francisco.
We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiers, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DEXTERSON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Near First and Market Streets, S. F.

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ESTABLISHED 1869.

Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations of Mines; Plans and Reports furnished.

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Mining Engineers and Metallurgists

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Ores Sampled and Assayed, and Tests made by my Process.

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GREAT REDUCTION!**BATTERY SCREENS.**

Best and Cheapest in America.

No imitation, no deception, no planished or rotten iron used. Only genuine Russia iron in Quartz Screens. Planished iron screens at nearly half my former rates.

I have a large supply of Battery Screens on hand suitable for the Huntington and all Stamp Mills, which I will sell at 20 per cent discount.

**PERFORATED SHEET METAL**

For Flour and Rice Mills, Grain Separators, Revolving and Sheet Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses.

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**WINANS' ANTI-INCORUSTATION POWDER
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For Removing or Preventing Scale, Corrosion and Pitting in Steam Boilers. Send for references. Also FRANKLIN RUBBER Mfg Co. Plumbago Sheet, and Piston and Valve Rod Packing, to be had only of **J. C. WINANS, 220 Fremont St., S. F., Cal.**

San Francisco Cordage Factory.
Established 1866.

Constantly on hand a full assortment of Manila Rope, Sisal Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice
TUBBS & CO.
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**CIVIL ENGINEER,
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121 Montgomery St., S. F.**JAMES LEFFEL'S
Mining Turbine Water Wheel.**

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Glove Cases, free of cost, by applying to the manufacturers.

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THE HIGHEST AMERICAN TUNNELING RECORD.

Of the Machine-Mined Mineral in the U. S., in 1887, three-quarters of the Iron Ore and two-thirds of the Copper Ore were mined with Rand Drills.

THE STANDARD

American Rock Drilling Machinery

For Mines, Tunnels, Quarries, Sowers, Grading, etc.

RAND DRILL CO.,
23 PARK PLACE, NEW YORK.

PAT. OCT. 26, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

Medart Patent Wrought Rim Pulley

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES

SEND FOR CIRCULAR AND PRICE LIST.

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THOMAS PRICE'S ASSAY OFFICE,**CHEMICAL LABORATORY,****BULLION ROOMS and ORE FLOORS,**

524 Sacramento Street, San Francisco, Cal.

COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.

Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Nov. 15, 1888.

Trade the past week was generally good in all lines. The market on metals is steady, with a firmer tone in lead. Money continues easy, with a gradual increase in the deposits. There is a growing impression that larger sums than ever before will be disbursed in next month for taxes. This is made quite certain from the fact that each county and incorporated town reports a very large increase in taxable property. The disbursements in January, 1889, for interest, dividends, etc., it is claimed will be all of from 25 to 33 1/2 per cent more than was paid out in January, 1888. To meet these requirements considerable money will have to be drawn out of general circulation, which may have a temporary effect in certain quarters on the money market. The sending to Europe by one of our leading iron works to have certain work done, owing to its relative cheapness, together with the determination of the owners of the steamer Australian to have two new boilers for the vessel made at Victoria, owing to its being done at a less cost for the ironwork, is awakening attention to the fact that unless we get iron cheaper or else labor cheaper, a large amount of work that should be done here will be sent to foreign countries.

SILVER—On Saturday the price of silver fell to 93 3/4 to 93 1/2; at the latter price a sale was made on Tuesday, a further decline of 1/4 was established; at the decline some few consignments changed hands. The offerings are light, and to have urgent wants met, an advance would have to be paid. The buyers in the market the past week were the Hong Kong and Shanghai bank and the Anglo-California bank. Since our last, advices have been received that the Peerless mine in the Quijotoa district has been added to the silver-bullion producing mines. The output will, it is claimed, aggregate about \$20,000 a month. The Navajo mine in the Tuscarora district is being worked. What the output from this mine will be it is difficult to say until after the first two cleanups. With water supply before the close of the month in that district, concentrators will be at work and the silver output increased. From the Comstock district the silver-bullion output will be increased by the milling of the ore from the Confidence mine, to which will be added at an early day, probably before the end of the week, the milling of ore from the Yellow Jacket, Hale and Norcross, Savage, Potosi, Chollar and two or three other mines. All that is now wanting is water-power, and this will be had with an early rainfall. The active prospecting work going on in several of the mines points to more being added before long to the ore-producing list.

London cables received to-day report silver steady at 43d. The New York market is quoted at 93 3/4. In this market 93 3/4 was bid to-day and refused.

QUICKSILVER—The price has receded to \$43 per flask, at which figure a good trade, both home and export, is reported.

LEAD—The market, as usual at this season of the year, is dull. Cannery and large consumers are not disposed to anticipate wants, and therefore are not contracting for future delivery.

COPPER—The market is steady but firm. All present information is confirmatory that work is being done in several mines on this coast to make them producers. The Calumet and Hecla mine's output in last month was 3900 tons of mineral—the largest monthly output on record.

TIN—For spot, to arrive and also prompt shipment, the market is dull. Large consumers appear to have contracted for the more urgent necessities and are disposed to await developments. The market has an easier tone.

BORAX—The New York Commercial Bulletin, Nov. 2d, says: The borax market under the "pool" influence has had another "rise" on the Pacific. The managers of this "combine" have advanced their ideas to 6 3/4 for concentrated, 7 1/2 for refined and 7 3/4 for powdered, all f. o. b. San Francisco. In offering at these prices to the public, shipments of the two former are not guaranteed before the 15th instant, and the latter not previous to December 16th, and sight drafts are then drawn on the buyers that have to be met upon receipt of documents. It is just one year this month that the combination was formed, and those interested have certainly good cause to feel satisfied with the results obtained, as the value during that period has shown a steady advance. In this market holders are quoting 8c for concentrated, in quantities for carload lots, 8 1/2c for refined and 8 3/4c for powdered. The estimated stock, which is closely controlled, is said to not exceed 60 tons concentrated and 40 tons refined. The demand, which is quite active at present, is largely from manufacturers.

IRON—The market is reported dull for both spot and to arrive. Large consumers are only tempted to buy freely by concessions in asking prices which holders are slow in doing. It is generally claimed that the present dullness will be followed by an active season next year, owing to many contemplated buildings going up soon after the winter rains.

COAL—The market continues to hold to strong prices, but with no further advance likely to be made. The yards are cleaning up better. Two cargoes of English coal arrived the past week. Heavy shipments will soon begin to be made from Australia to this coast. The consumption of coal is steadily increasing.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Nov. 15, 1888.—The following are the closing prices the past week:

	London	Silver	Copper	Lead	Tin
Thursday	43 1/2	94	87 1/2	53 70	822 00
Friday	43 1/2	94 1-10	17 55	3 75	22 40
Saturday	43 1-10	93 15-16	17 45	3 75	22 50
Sunday	43 1/2	93	17 50	3 70	22 45
Tuesday	43 1/2	93 1/2	17 50	3 70	22 35
Wednesday	43 1/2	93 1/2	17 45	3 70	22 30

The market closed as follows: Borax is steady at

the recent advance. Quicksilver is quoted at from 63 to 65 cents. Lake Ingot copper is nominal at 17 1/2. Casting brands \$16 to \$16 1/2. The trade obtains its supplies of pig lead at \$3 3/4 to \$3 1/2. Petroleum refined, in barrels, is selling at 7 1/2; in plain cases at 9 1/2.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

TIN—Opened on Monday fully steady, but sagged off each day until yesterday afternoon, when the recovery in London stimulated a slight advance here. Spot had lost 35, and futures 20 to 30 points from the highest, but the subsequent improvement reduces the net loss to 20 and 10 and 15 points respectively. Considerable attention has been paid to the calls, but there has been only one sale reported.

COPPER—Began also to take on more life, without as yet assuming the dignity of an active market. No business whatever has been accomplished on the floor, making the first absolutely blank week this year; yet the tentative disposition to trade has been so much improved that the market may be considered as really brisker. The tendency has been toward a lower level, asking prices being reduced while bids were not advanced to meet them until firm cables were received; but the movement has been very slight.

LEAD—Declined to 15 points at the opening, and continued dull and heavy until Thursday, when a spurt upward was made on free buying, followed by a moderate reaction with a quieter market. Sales for the week are 482 tons in all, nearly all on the advance, and none made "under the rule."

SPELTER—Has been very dull and hardly any nominal prices even made.

PIG IRON—Reports begin to show variation. Some talk prices steady, while others say that buyers are hesitating, owing to an increase in the offerings. Furnaces are so well sold up, however, that they are not likely to change their ideas until stocks begin to accumulate, of which there are no signs at present.

STEEL RAILS—Sellers in this market are not disposed to meet the low prices talked about at other points. They find prices so near to cost, and cost so steadily hardening, that they are in no mood to quote less than \$23 until they can see a little further ahead.

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Billiton Tin, @—; Banca Tin, @—; Baltimore Copper, \$— @—; Orford Copper, \$16.00 @ 16.25; P. S. C. Copper, @—; Foreign Lead, \$4.75 @ 5.00; Foreign Spelter, \$5.40 @ 5.50; Antimony, \$10.00 @ 13.50.

San Francisco Metal Market.

WHOLESALE. THURSDAY, NOV. 15, 1888.

	13 @ 14	15 @ 16
ANTIMONY—French Star	7 1/2 @ 7 3/4	7 3/4 @ 7 1/2
BORAX—Refined	13 @ 14	14 @ 15
Concentrated	16 @ 17	17 @ 18
COPPER		
Bolt	26 @ 27	27 @ 28
Sheeting	26 @ 27	27 @ 28
Ingot	16 30 @ 19 00	19 00 @ 20 00
Fire Box Sheets	— @ 26	— @ 27
IRON—Glengarnock ton	— @ 26	— @ 27
Elgin ton	— @ 26	— @ 27
American Soft No. 1 ton	— @ 26	— @ 27
Oregon Pig ton	— @ 26	— @ 27
Olay Lane White	— @ 26	— @ 27
Shotts, No. 1	— @ 26	— @ 27
Bar Iron (base price) lb.	22 @ 23	23 @ 24
Chrome iron ore, 5 ton	8 @ 10	10 @ 12
LEAD—Fig.	5 @ 5 1/2	5 1/2 @ 5 3/4
Bar	5 1/2 @ 5 3/4	5 3/4 @ 5 1/2
Sheet	8 @ 8 1/2	8 1/2 @ 8 3/4
Pipe	7 @ 7 1/2	7 1/2 @ 7 3/4
Shot, discount 10% on 200 bags	1 1/2 @ 1 3/4	1 3/4 @ 1 1/2
Buck, 20 bag	1 1/2 @ 1 3/4	1 3/4 @ 1 1/2
Chilled, do.	2 00 @ 2 05	2 05 @ 2 10
STEELE—English, lb.	16 @ 17	17 @ 18
Caution tool	9 @ 10	10 @ 11
Black Diamond tool	10 @ 11	11 @ 12
Pick and Hammer	8 @ 10	10 @ 12
Machinery	4 @ 5	5 @ 6
The Calk	41 @ 42	42 @ 43
TRIPLE—Coke	5 00 @ 5 15	5 15 @ 5 30
Charcoal, 14x20	6 75 @ 7 25	7 25 @ 7 75
do roofing, 14x20	5 50 @ 5 62 1/2	5 62 1/2 @ 5 75
Pig tin, 14x20	24 @ 25	25 @ 26
QUICKSILVER—By the flask	1 00 @ 1 05	1 05 @ 1 10
Flasks, old	85 @ 90	90 @ 95

PRICES OF COAL "TO ARRIVE."

	Per Ton.		Per Ton
Anstralian ...	\$11 50 @12 00	Cardiff	11 00@11 50
Liverpool St'm	12 00 @12 50	Lehigh Lump.	15 00@15 50
West Hartley.	12 50 @13 00	Cumberland bk17	00@18 00
Scotch Splint.	12 00 @12 50	Egg, hard.....	15 00@15 50

New Incorporations.

The following companies have been incorporated, and papers filed in this office of the Superior Court, Department 10, San Francisco:

SAN FRANCISCO AUTOMATIC GASLIGHT CO., Nov. 9. Object, to manufacture gas apparatus under patents issued to Louis Marks, Capital stock, \$1,000,000. Directors—C. W. Grimm, J. Van Angelbeck, G. Schlessinger, Geo. Buckhardt and Louis Marks.

PURITY WINE CO., Nov. 12. Capital stock, \$150,000. Directors—R. J. Harrison, D. M. Cashin, T. H. Kearney, E. W. Fraser and E. J. Fraser.

BUTTE DEVELOPMENT CO., Nov. 12. Object, to develop, purchase and sell mines. Capital stock, \$500,000. Directors—F. H. Hausman, Walter Speyer, Ed. Benjamin, E. R. Chapman and Otto Tum-Suden.

WICKHAM MANUFACTURING CO., Nov. 13. Object, to manufacture furniture. Capital stock, \$12,000. Directors—D. C. Wickham, M. A. Graham, W. G. Hughes, J. F. Eaton and W. J. Reed.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO.	AM'T.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alta S M Co.	Nevada.	33.	50, Sept.	23. Nov.	26.	J. Osborn.	309 Montgomery St.	
Andes S M Co.	Nevada.	34.	25, Oct.	5. Nov.	12.	Dec. 3, B. Burris.	309 Montgomery St.	
Alpha Con M Co.	Nevada.	21.	87 1/2, Nov.	3. Dec.	8.	Dec. 23, C. E. Elliott.	309 Montgomery St.	
Alpha Con M & M Co.	Nevada.	2.	25, Nov.	3. Dec.	8.	Dec. 23, E. E. Elliott.	309 Montgomery St.	
Bodie Con M Co.	California.	9.	50, Sept.	24. Oct.	29.	Nov. 30, G. W. Sessions.	309 Montgomery St.	
Best & Belcher M Co.	Nevada.	41.	25, Oct.	14. Nov.	21.	Dec. 11, L. Osborn.	309 Montgomery St.	
Benton Con M Co.	Nevada.	18.	1,00, Oct.	29. Dec.	3.	Dec. 24, V. B. Allen.	330 Pine St.	
Crown Point C & S M Co.	Nevada.	50.	50, Oct.	2. Nov.	5.	Nov. 26, J. Newlands.	329 Pine St.	
Cholla M Co.	Nevada.	26.	50, Oct.	8. Nov.	13.	Dec. 5, C. E. Elliott.	309 Montgomery St.	
Con Imperial M Co.	Nevada.	25.	05, Oct.	16. Nov.	21.	Dec. 12, C. L. Metcay.	330 Pine St.	
Caladonia S M Co.	Nevada.	43.	15, Oct.	19. Nov.	21.	Dec. 12, A. S. Groth.	414 California St.	
Del Monte M Co.	Nevada.	1.	25, Oct.	15. Nov.	20.	Dec. 12, J. W. Pew.	310 Pine St.	
Found Treasure M Co.	Nevada.	4.	06, Oct.	25. Nov.	30.	Dec. 21, J. R. Stafford.	309 Montgomery St.	
Gould & Curry S M Co.	Nevada.	60.	30, Oct.	2. Nov.	9.	Nov. 30, A. K. Durbrow.	309 Montgomery St.	
Grand Prize M Co.	Nevada.	19.	50, Oct.	13. Nov.	17.	Dec. 5, R. R. Grayson.	327 Pine St.	
Gray Eagle M Co.	Nevada.	10.	05, Nov.	13. Dec.	18.	Jan. 8, O. H. Bogart.	327 Pine St.	
Horseshoe Bar Con M Co.	California.	1.	25, Oct.	9. Nov.	17.	Dec. 10, D. M. Kent.	330 Pine St.	
Justice M Co.	Nevada.	47.	25, Sept.	23. Oct.	31.	Nov. 19, R. E. Kelly.	419 California St.	
Keyes S M Co.	Nevada.	3.	25, Oct.	22. Nov.	24.	Dec. 15, M. P. Minor.	328 Montgomery St.	
Lord of Lorn M Co.	Nevada.	4.	10, Nov.	13. Dec.	23.	Jan. 12, L. G. Harvey.	313 California St.	
Mayflower Gravel M Co.	California.	43.	50, Oct.	16. Nov.	16.	Dec. 10, J. Morio.	328 Montgomery St.	
Mono G M Co.	California.	26.	50, Sept.	20. Oct.	23.	Nov. 28, G. W. Sessions.	309 Montgomery St.	
Montrose M Co.	Colorado.	1.	13, Oct.	3. Nov.	12.	Dec. 15, F. E. Luty.	330 Pine St.	
North Belle Isle M Co.	Nevada.	13.	50, Oct.	23. Nov.	27.	Dec. 19, J. W. Pew.	310 Pine St.	
Puget Sound Iron Co.	Washington.	12.	1,00, Oct.	15. Nov.	23.	Dec. 21, J. W. Pew.	310 Pine St.	
Potosi M Co.	Nevada.	31.	50, Oct.	1. Nov.	6.	Nov. 27, C. E. Elliott.	309 Montgomery St.	
Puget Sound Iron Co.	Washington.	12.	1,00, Oct.	23. Nov.	23.	Dec. 21, A. Halsey.	328 Montgomery St.	
Russell Reduction & M Co.	California.	3.	10, Oct.	18. Nov.	26.	Dec. 17, J. Morio.	328 Montgomery St.	
Savage M Co.	Nevada.	41.	50, Oct.	4. Nov.	7.	Nov. 27, E. R. Holmes.	309 Montgomery St.	
Sierra Nevada M Co.	Nevada.	43.	25, Nov.	8. Dec.	13.	Jan. 2, E. L. Parker.	309 Montgomery St.	
Tuscarora Con M Co.	Nevada.	1.	05, Oct.	1. Nov.	14.	Dec. 5, J. J. Scoville.	309 Montgomery St.	
Utah Con M Co.	Nevada.	5.	35, Oct.	4. Nov.	8.	Nov. 26, A. H. Fish.	309 Montgomery St.	
Van Penn M & M Co.	Nevada.	3.	10, Nov.	8. Dec.	17.	Dec. 31, J. J. Scoville.	309 Montgomery St.	

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
California Slate Co.	California	J. O. Hanson.	10 California St.	Annual	Nov. 26
Keyes S M Co.	Nevada	M. P. Minor.	328 Montgomery St.	Annual	Nov. 22
Kentuck M Co.	Nevada	J. W. Osborn.	310 Pine St.	Annual	Nov. 23
North Gould & Curry M Co.	Nevada	C. H. Mason.	331 Montgomery St.	Annual	Nov. 17
Puget Sound Iron Co.	Oregon	A. Halsey.	328 Montgomery St.	Annual	Nov. 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada	A. W. Havens.	309 Montgomery St.	50.	Oct. 11
Confidence S M Co.	Nevada	A. S. Groth.	309 Montgomery St.	1.00.	Aug. 6
Caladonia M Co.	Nevada	A. S. Groth.	328 Montgomery St.	65.	Nov. 26
Caladonia Con M Co.	Nevada	A. S. Groth.	328 Montgomery St.	34.	Nov. 12
Furcula Con M Co.	Nevada	H. R. P. Hutton.	306 Pine St.	25.	July 9
Mt Diablo M & M Co.	Nevada	R. W. Heath.	318 Pine St.	25.	Aug. 27
North Star M Co.	California	D. A. Jennings.	401 California St.	50.	Nov. 11
Hale & Norcross S M Co.	California	J. F. Lightner.	309 Montgomery St.	50.	Aug. 8
Idaho M Co.	California	J. F. Lightner.	Grass Valley	50.	Oct. 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING OCT. 25.	WEEK ENDING NOV. 1.	WEEK ENDING NOV. 8.	WEEK ENDING NOV. 15.
Alpha	3.05	3.80	3.15	3.85
Alta	1.85	2.90	2.20	3.10
Andes	1.20	1.40	1.30	1.50
Alpha Con M Co.	1.20	1.40	1.30	1.50
Alpha Con M & M Co.	1.20	1.40	1.30	1.50
Bodie Con M Co.	6 1/2	8 1/2	7 1/2	9 1/2
Best & Belcher	7 1/2	9 1/2	8 1/2	10 1/2
Bullion	1.70	2.20	1.70	2.20
Bathmore	.40	.75	.70	.75
Bodie	1.65	2.00	1.75	2.30
Bodie Con M Co.	1.65	2.00	1.75	2.30
Benton	2 1/2	3.00	2.50	3.00
Bodie Tunnel	7 1/2	9 1/2	8 1/2	10 1/2
Bulwer	1.00	1.00	1.00	1.00
Con. Va. & Cal.	1.00	1.00	1.00	1.00
Challenge	6.50	7.25	6.50	7.25
Champion	4.00	4.70	3.65	4.25
Chollar	1.00	1.00	1.00	1.00
Confidence	25	22	22	23
Con. Imp.	85	100	125	100
Caladonia	55	75	65	80
Con. Pacific	65	75	65	80
Crown Point	35	40	40	45
Crocker	35	40	40	45
Central	35	40	40	45
Dudley	35	40	40	45
East B. & E.	35	40	40	45
Eureka Con	35	40	40	45
Excelsior	1.05	2.00	1.00	1.50
Grand Prize	40	45	40	45
Gould & Curry	4.40	5.75	4.55	5.10
Hale & Norcross	6.75	7.75	6.75	7.75
Holmes	1.00	1.00	1.00	1.00
Independence	1.00	1.00	1.00	1.00
Iowa	50	55	55	60
Julia	50	55	55	60
Justice	1.35	2.80	1.80	2.50
Kentuck	3.50	4.50	3.50	4.50
Lady Wash.	70	85	70	85
Lady Wash.	70	85	70	85
Martin White	1.05	1.90	1.60	1.85
Mono	1.05	1.90	1.60	1.85
Mexican	4.80	6.10	4.80	6.10
Mt. Diablo	1.00	1.00	1.00	1.00
Northern	1.00	1.00	1.00	1.00
Nevada	2.05	2.15	2.30	2.60

Assessment Notices.

William Penn Mill and Mining Company.
Location of principal place of business, San Francisco, California. Location of works, Devil's Gate Mining District, Lyon county, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 5th day of November, 1888, an Assessment (No. 3) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 59, Nevada Block, No. 309 Montgomery street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 13th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 31st day of December, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. J. SCOVILLE, Secretary.
Office—Room 59, No. 309 Montgomery street, San Francisco, California.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 13th day of November, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 23rd day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Tuesday, the 23rd day of January, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.
Office—313 California St., San Francisco, Cal.

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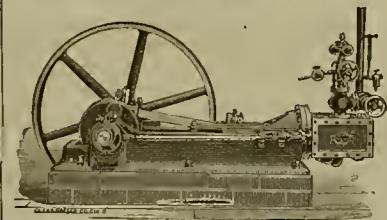
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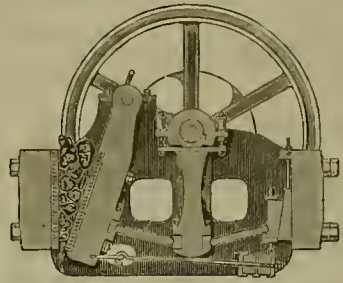
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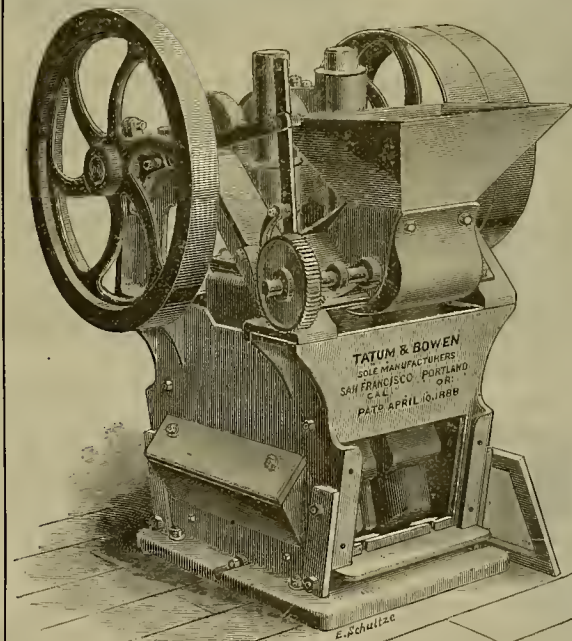
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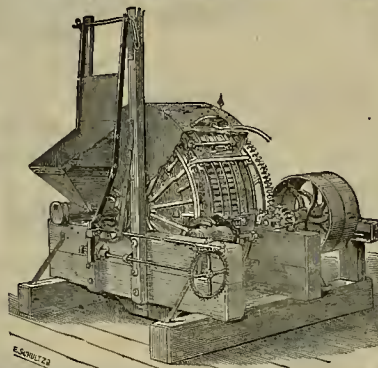
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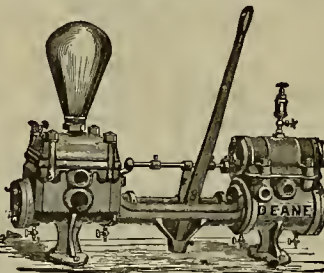
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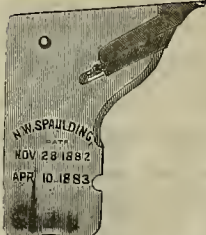
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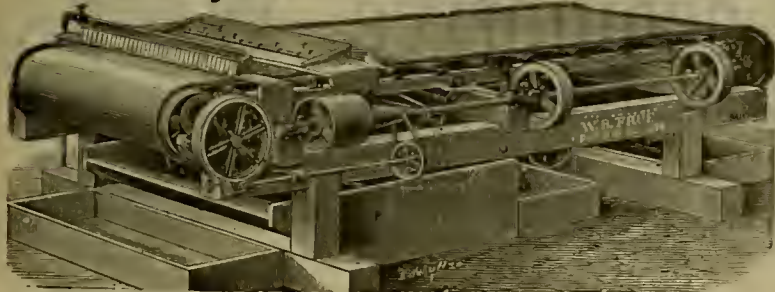
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THE MONTANA COMPANY (Limited).

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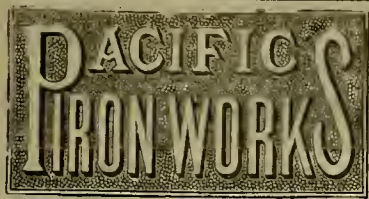
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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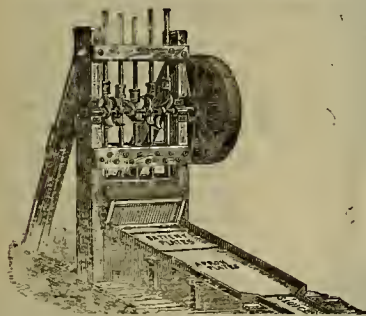
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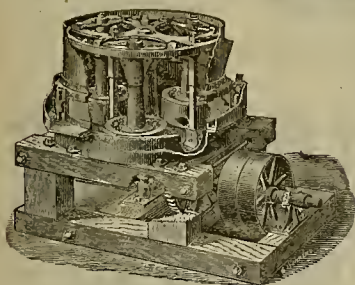
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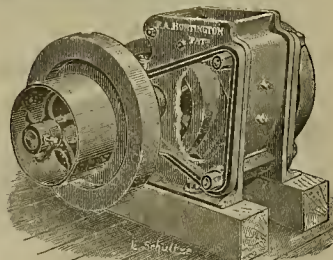
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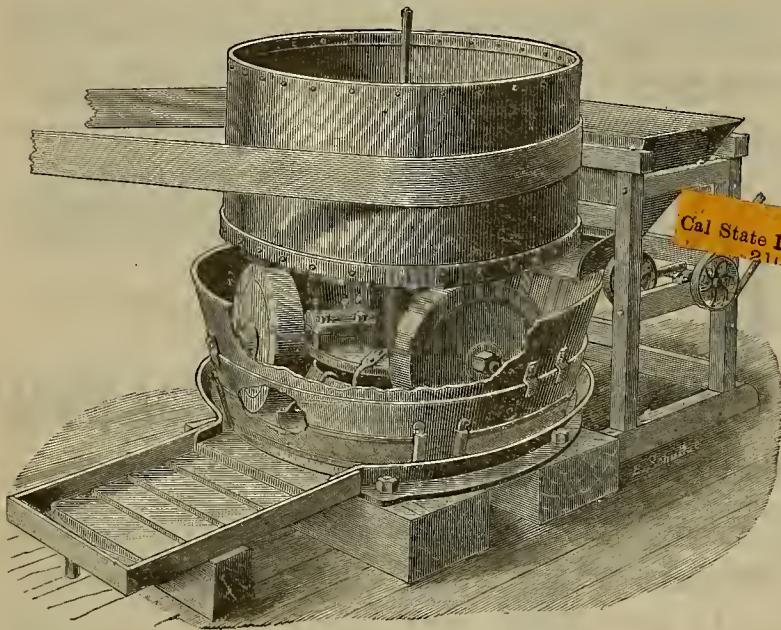
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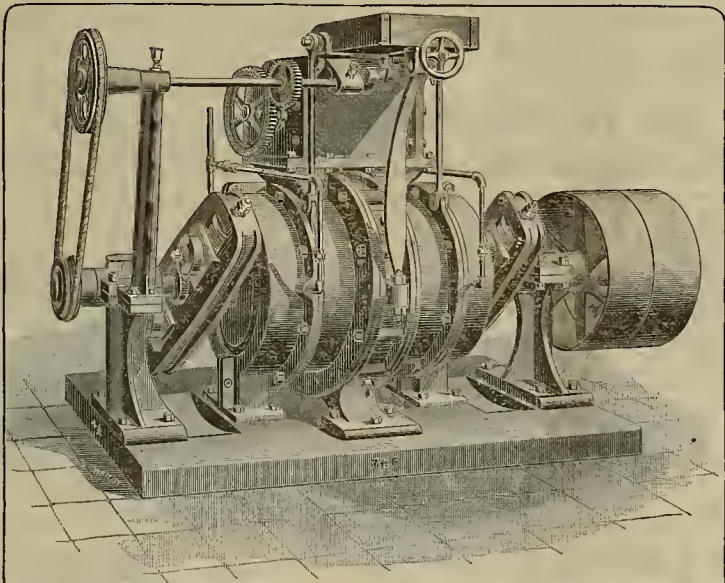
OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

Risdon Iron Works, San Francisco.—ORNTLMRN: Our Company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60-mesh screen. Our mills run 65 revolutions per minute, and each crush through 60-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set

of Tyres will crush 1500 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "peon" earning one dollar per day has complete charge. In regard to sliming, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slimes is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismantled in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequalled by any mill now in existence.
Yours truly,
D. M. BURNS, Superintendent.

FRISBEE WET MILL.

This Mill, with a weight of less than 9000 pounds, has a capacity of three tons per hour of hard quartz to 40 mesh; is in successful operation and we guarantee its work as represented.



IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

And renewals will not cost over one-half as much as for stamps. Will run empty, or with small amount of ore without injury. The attention of parties having Cement Gravel is called to this Mill, as it will run 100 tons per day to No. 8 mesh; 30 to 35 H. P.

OUR DRY MILLS are the most economical ever built, and are extensively used with record of several years. No grinding in pans. Mill finishes to any fineness desired.

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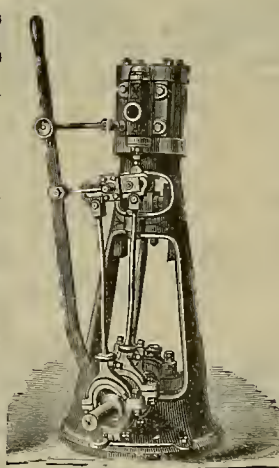
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THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. L. Fisher, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two localities. Ore assays \$7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, NOVEMBER 24, 1888.

VOLUME LVI
Number 21.

Iron Stills for Acid.

In the PRESS of Nov. 10th were reproduced cuts from Mr. Adams' paper on "Concentration of Sulphuric Acid," showing improved iron stills. Fig. 1 of the accompanying engravings shows still another modification—one of the latest and most successful types now at work. The simplicity and inexpensive construction of this apparatus commend it on sight; and, with gas-firing, the plant is a long way in advance of any made known as yet. By this entirely new method of working the flow of acids from pans to stills is continuous; the evaporation from the surface of the still proceeds rapidly and quietly; the sediments, from whatever source, are swept along and out of the still in the constant flow of a small current of strong acid; and, taking temperature and density into account, are precipitated in regular order in the larger space of the outside boot, where they remain until removed by the basin-shaped ladle.

It is Mr. Adams' opinion that cast iron has "come to stay," with a value for chemical purposes as yet little understood, but which the world must naturally profit by—a value due almost wholly to investigation, experiments and successes of Americans; a value sure to be hereafter acknowledged in the making up of cost-sheets on sulphuric acid. This practical use of the metal marks a change as worthy of recognition as the Gay-Lussac column, or the Glover tower, in their respective spheres—each of them most radical changes in the manufacture of this essential product.

By this use of iron, and this method of handling the contaminated acids produced from ores so abundant in our country, all the difficulties

heretofore met in the final preparation of strong sulphuric acids are overcome at a bound. Local circumstances will naturally call for modifications in the use of cast-iron stills.

after all, only a simple problem of distillation, which has heretofore been attended with difficulties solely on account of the tendency of the metals or minerals held in solution to cake or

Under a High Head.

The water-power and electric plant on the Sutro tunnel level of the Chollar incline for transmitting electric-power to operate the Nevada mill, is nearly ready for work. They tried the Pelton wheels and dynamos the other day. The phosphor-bronze wheels are 40 inches in diameter, and are driven under a pressure of 1630 feet. Water-wheels running under a vertical column of 1630 feet in height have never before been seen. Still these ran as smoothly as the other wheels in use on the Comstock under a pressure of only 500 to 600 feet.

The wheels are to run the dynamos for transmitting electric-power to the mill. The conditions are different from any ever tried before, though the work is by no means of an experimental character. It is known exactly what the Pelton wheels will do, and if the electrical appliances do their part of the work, as may be expected, there will be no trouble. The test must be satisfactory to the Nevada Mill Co. before the plant is accepted, but the system has been so thoroughly tested in other localities that there is little fear of its not operating. The Nevada mill will crush ore from the Hale and Norcross, Chollar and Potosi mines.

At a meeting in Pittsburg of the river coal operators, November 19th, it was unanimously decided to shut down all the mines along the Monongahela river for an indefinite period. This will

throw out of employment 1000 miners, besides all the river men engaged in the transportation of coal. The operators say the shut-down will be for two months at least. They claim they cannot sell to advantage now, as the market is overstocked and coal is low.

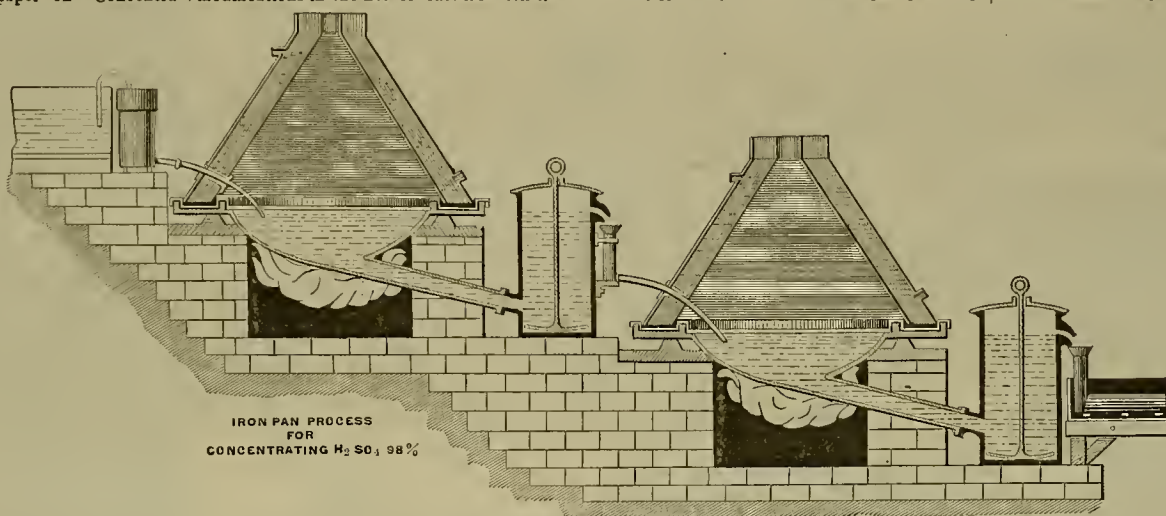


Fig. 1.—IMPROVED MODERN IRON STILL.

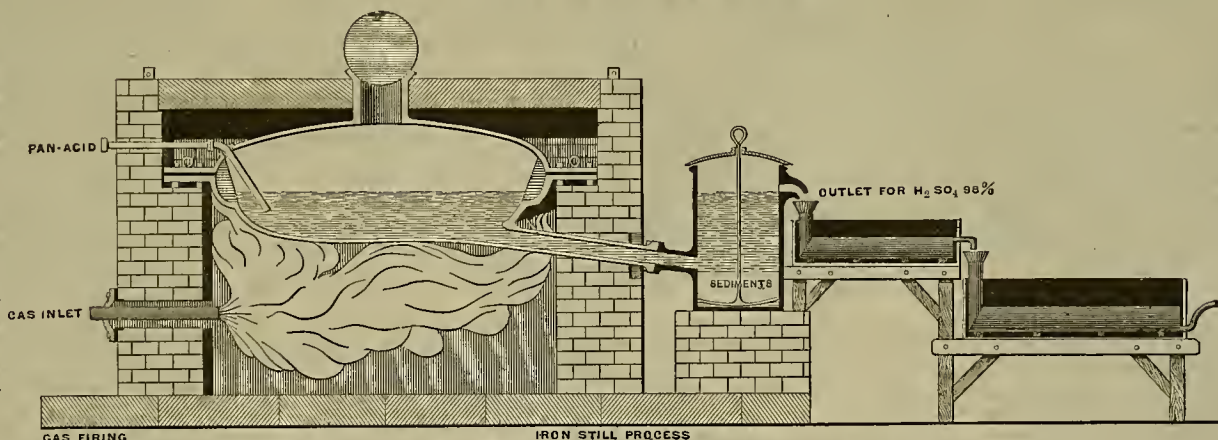


Fig. 2.—IMPROVED STILL FOR STRONG AND PURE ACID.

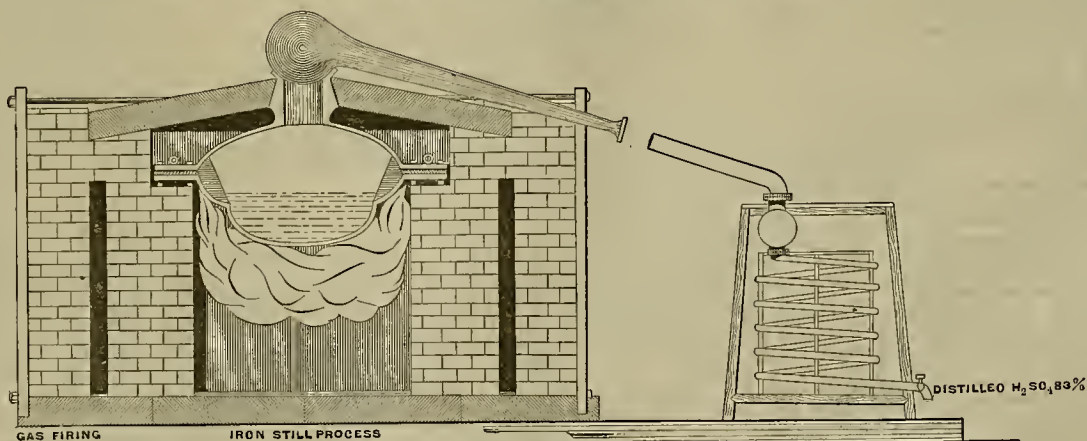


Fig. 3.—SECTION OF IRON PAN AND STILL.

The manufacture of virtually a new article in the trade (an acid of regular strength, and pure) will become general throughout the world in course of a few years; and we may expect to have presented many devices, of a more or less complicated nature, to accomplish what is,

cement on the bottom of the stills. It will be seen that nothing can be simpler or more effective for this service than the pot shown on page 329 of last week's PRESS, modified to the present perfected stills as shown in Figs. 2 and 3 on this page.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Washington Territory Mines.

EDITORS PRESS:—As the mining season is about at a close, a brief summary of events may prove of general interest. At Chemellah, 52 miles north of here, the Eagle mine put in steam hoisting works. They have a four-foot vein of ore that yields per cubic yard one ton of galena ore, 60 per cent lead and 70 ounces silver. A depth of 170 feet is attained, with 300 tons of ore on dump. The Enterprise has a few stringers of copper ore rich in copper and silver. At Brown's Lake, four miles west, assessment work done on the Fisher shows 20 inches of 60 per cent copper ore at a depth of 50 feet. No other mines in this camp have been worked worthy of mention. A new strike of high-grade ore nine miles north promises well. Fifty tons of 200-ounce silver ore are already on the dump.

At Colville,

The smelter run by Moore & Vivian succumbed to the inevitable and quit the business after a year's trial. The only money made out of the concern was by the organizer of the concern, who got a salary of \$800 per month out of the stockholders. The Old Dominion, which has produced in the last three years about \$200,000, has been worked by the Kearneys, who have been trying hard to liquidate a \$30,000 mortgage held by the Traders' National Bank of Spokane, but now have to turn the mine over to the bank and step down and out. The bank assumes the management, and will undoubtedly make it pay.

The Daisy, on the Columbia river, shows ten feet of self-fluxing lead carbonates. At the 200-foot on the crocset they have ore of an average value of 35 ounces silver and 30 per cent lead. The Bonanza has 40 inches of galena at a depth of 80 feet, with 50 per cent lead and 12 ounces silver. The owners can't agree, and work has been suspended. The Dead Medicine, up Clugstone, shows 20 inches of 80-ounce ore, 40 per cent lead. The Young America had the bottom dug out, and is a thing of the past. The Gray & Palmerston mine, above the Dalles, is in about the same condition. Up Kettle river no discoveries have been made worthy of notice. At Rock Creek a little development work ruined prospective fortunes and matters are *in statu quo*.

At Wannecott Lake

Are several flattering prospects; among them, the Triune and Jessie have fair chances of becoming paying properties. Considerable scratching has been done all over this district, with indications rather against it.

South 40 miles on Salmon river, or rather creek, the outlook is tough. A concentrator having a capacity of 50 tons per day was erected on the Homestake and Tough Nut properties. When the concentrator was ready to run, five or six tons of ore were on the dump. About 100 tons of barren rock, or most of it, was run through to make a showing, but the Tacoma inventors, after building two steamboats to carry one ton of ore out of the country at an expense of \$40,000, have let the property be attached by the help. Considerable work has been done in the camp, and while the ledge go deep and are regular, they only carry pay in small patches here and there.

The Mines Near Ruby City

Have had a good deal of work done on them. The Arlington mine on the surface averaged 15 ounces silver. Thirty thousand dollars was paid for it by Portland capitalists, and Prof. Clayton reported some hundreds of thousands in eight. A tunnel goes from the Oregon Pacific road was put in charge of the property, who ran a tunnel 450 feet deep, to gain a depth of 100 feet, at an expense of \$15,000, while a shaft representing the same development could have been sunk for \$1200. At 200 feet their ore body 4½ feet wide averages \$15 per ton silver and is worthless. The First Thought, on the same hill, shows a good streak of pay ore and may survive the working test. The War Eagle and Idaho are losing propositions. The Fourth of July has had no development work worthy of notice.

Bad Judgment.

The building of a concentrator and two steamboats by Tacoma people with no development work and no ore in sight (and what little there was being too low grade to pay mining expenses) is without a parallel since Ike Bateman organized his steamboat company to navigate Reece river, Nevada. The Riley gold-mill put up at Colville to run on barren rock was bought by Jos. F. Wardner, and moved to Elk Creek, near Wardner, and is now hammering out \$32,000 per month in clean bullion.

In the Cœur d'Alene all is bustle and excitement. New concentrators, hoisting works, gold-mills and large ore bodies are the order of the day, with more ore piled up at the stations than the railroad can handle. Two railroads are building in there side by side.

Kootenai River or Lake District

Is coming to the front with three or four prospective good properties. Twenty-one tons of ore shipped to Butte netted the Halls \$7200. The ledge are large, but pay streaks 20 to 30 inches.

South of Pend d'Oreille lake, on the headwaters of Cœur d'Alene river, or the North fork,

some fine bodies of 70 to 80 ounces silver and lead ores have been discovered and a promising district has just been organized. Down on Pend d'Oreille river at the falls several lead mines carrying but a trace of silver have been sold to the Great Falls (Montana) smelting folks, and steamers are to be put on by Portlanders in the spring to transport the ore to Sand Point, on the Northern Pacific road.

South of here they have made some lead discoveries near Moscow that look anything but flattering.

Upon the whole, Cœur d'Alene and Kootenai have had a prosperous year, while Salmon River and Colville do not come up to expectations. Colville, however, has a future when the property gets into the hands of the proper parties. The Seattle, Lake Shore & Eastern railroad now runs ten miles west, and will have 60 miles of road running west toward the Great Bend this month. The Oregon Railway & Navigation Co. are pushing their road from Rockford, 25 miles distant, to this point with all possible haste.

Spokane Falls, W. T.

OBSERVER.

Electric Lighting by Incandescence.

[Written for the PRESS by GEORGE B. FRALEY.]

The light of an incandescence lamp has been shown to be suitable in every respect for domestic use. Its characteristics are the characteristics of daylight. In steadiness it is comparable only to the light of the sun. No other artificial light, not excepting that of the best Argand burner, is as steady. The cause of this is that the combustion of the carbon is prevented, and when the carbon is raised to the temperature of limpid incandescence there is no difference between the light evolved and that which, proceeding from the sun, is diffused and softened by the stratum of air it traverses. The heat radiance is much less than that of gaslight of equal power; the noxious vapors proceeding from the combustion of illuminating gas disappear; no chemical action takes place, but, hermetically sealed in its crystal chamber, protected from danger of fire and explosion, a fragment of carbon glittere and glows, rises to the light of a taper, brightens and broadens and finally illuminates with the effulgence of day. This is what the incandescence light should be and what it is under proper conditions.

Cost Compared with Gas.

There being no question as to the adaptability of this new illuminant to all the purposes of interior illumination, the other and most important question that arises is one of economy. Is this light, which is better than gaslight, as cheap as or cheaper than gaslight? In the best steam engines the consumption of coal per hour per horse-power is two pounds, costing at \$5 per ton one-half cent. One pound of coal yields five cubic feet of gas, and therefore the cost of one cubic foot of gas is one-twentieth of one cent. To produce the light of 600 candles by the incandescence machine involves the consumption of one pound of coal, costing one-quarter cent. To produce equivalent light from gas at a rate of consumption of five cubic feet per 15 candle light, we must burn 150 cubic feet, and the cost of production at one-twentieth of a cent per cubic foot or 50 cents a thousand is 7½ cents. Thus the cost of electric is as to fuel consumption but one-thirtieth the cost of gaslight; but there is an advantage in the respect of coke recovered in the retort in case of gas, which may be said to increase the cost of electricity.

One cubic foot of coal gas equals 690 heat units or 532,680 foot-pounds, and five cubic feet equals 2,663,400 foot-pounds. The five cubic feet of gas burned in the boiler of a steam engine recovering ten per cent of the energy conserved in the gas, will yield in mechanical force $\frac{266,340}{1,580,000}$ horse-power, which would develop in the electric lamp a light of 130 candles. Burned in a gas-burner, it develops but 15 candle-light, therefore it is cheaper to convert coal into gas and gas into steam-power, and the steam-power into electricity, and the electricity into light, than it is to produce light by the direct consumption of gas.

The cost of lighting has almost invariably been unfairly stated by the gas interest. On the other hand, by the electric-light interest, the statements of the former have been based upon the working of small steam engines, and the cost of running them is always excessive, and the cost of attention always excessive, because confined to a limited development of power. With large steam engines, however, that is, engines of 100-horse power, it is less than one cent per hour. Instead of taking the cost of gas as the basis of calculation, the electric-light interest has considered the cost as it would the retail price of any production. Furthermore, the gas interest has invariably urged the cost of the conducting wires as an insurmountable obstacle to the general use of the electric, and bases its conclusions upon the size of the wires employed in uses of the voltaic arc lamps, where the utmost utilization of the current has been attempted.

In no case will the cost of electric maine equal the cost of gas mains; in most cases it will fall below 50 per cent of the cost of gas mains. In no case will the cost of branch electric conductor equal the cost of branch gas conductor.

Advances in Electric Lighting.

In turning from the contemplation of this subject, it is useful to consider that the ad-

vances made in electric lighting within a very few years are of a nature calculated to raise our anticipations to a point beyond the warrant of actual facts. When we recall to mind that from the discovery by Oersted in 1820 that an electric current would deflect a magnetic needle, and from the later discovery by Faraday of the phenomena of magnetic induction we have realized the electric telegraph and the electric light of to-day, we may consistently congratulate ourselves on the age in which we live. But we should not be sanguine that because of all this the millennium is close at hand. The application of electricity to public and private illumination is a realization of the near future no longer to be questioned. It is not probable, however, that electricity will ever entirely supersede gas. Indeed, it does not appear that illuminating gas has materially affected the consumption of illuminating oils. There is room and will doubtless continue to be for all methods of artificial lighting. It is not likely for many years to come that we shall witness anything other than the extensive use of electricity, nor shall public buildings and private residences, streets and squares be better illuminated than at present, the new form of light keeping pace, however, with the progress of older and well-tried institutions.

Fleas.

EDITORS PRESS:—We seem to be having a plague of fleas this year in San Francisco. A single (or married) flea is capable of ruining my night's rest, not so much by its biting as by its hilarity thereafter. I have tried buhach, or insect powder. It did some service, but was not prohibitory in its effects. But all things come to those who know how to wait—if they live long enough—and I have solved the problem of sleeping in peace, so far as fleas are concerned. Every night, before retiring, I scrape with a knife a small quantity of camphor—less than a gramme—and sprinkle the lower sheet with it. I undress at some distance from my bed, then turn my nightdress inside out and shake it before putting it on; thus I take no fleas to bed with me, and I have no further trouble. Not only do I escape molestation at night, but it seems that my skin becomes so impregnated with the camphor that I am no longer annoyed, as formerly, by the little wretches getting into my socks and underclothing in the daytime as they formerly did.

Let the fiat go forth—the fleas must go!

JOB PRESS.

The Folsom Dam.

Water Turned Into the Main Channel.

There were great times at Folsom prison on the 15th inst. The temporary dam which had been built to divert the waters of the American river during the partial construction of the solid dam of granite, was blown up in the presence of a large assemblage, and the waters came rushing down upon and through the culverts in the formidable wall of stone masonry.

A mighty cheer went up from the scores of convicts who had been employed in the work of construction, and Horatio P. Livermore, manager of the Folsom Water-Power Company, Engineer Humbert and Warden Aull were overwhelmed with congratulations. The cornerstone for the new dam was laid Sept. 18th, and since that time, with convict labor, 90,000 cubic feet of solid masonry has been put down. The foundation of the structure is 26 feet below the bed of the river, and is placed upon solid rock. It is 60 feet at the base and 52 feet at the top. When completed it will be over 40 feet in height, giving a fall which will afford illimitable power.

Warden Aull told a *Chronicle* correspondent that if he had a sufficient number of men he would guarantee that both the dam and the canal would be completed within one year. It is believed that when this is done there will be ample power to run all the manufacturing establishments which may be placed on the canal, and that, with the assistance of electricity, power will be furnished to run every wheel in Sacramento, leaving the water to irrigate thousands of acres of land.

LOST DIGGINGS.—The utter failure of the last and best expedition to discover the lost Adame's diggings, the tales of the richness of which are legion, has served the good end of forever dispoising of the "hoodoo" that has led so many adventurous prospectors to the laughter. It is now generally conceded that Adams was crazy, or a great dreamer, for it is utterly absurd to believe that a glittering box canyon of gold quartz nine miles in length, having a stream of living water equal in volume to the Socorro hot spring, can yet be hid away by the Indian and remain unrevealed to the white man. The Socorro mountain and its hurried church treasure may now come to the front.—*Pueblo Chieftain*.

THE sum of \$241,601 was spent at Mare Island during the past year, and this year \$503,127 is asked for. Of this, \$40,000 is wanted for a rolling-mill, \$80,000 for the granite drydock and \$211,000 for extension of the quay-wall. They intend putting up three 12-ton swing-crane along the water-front.

California Woods in Autumn.

Edward L. Greene, assistant professor of botany in the University of California, contributes the following charming sketch to the *Garden and Forest* of New York City:

Although California lies wholly within latitudes which, in other lands, give marked changes of the seasons, yet here neither spring nor autumn is very definitely characterized; autumn less so than spring, if that may be called a vernal season, which begins in November or December, comes to a halt in January, thence gradually advancing to its perfection in April, a half year after it begins.

Between July and November the face of nature undergoes but little change, and only the eye of the artist or naturalist will perceive the transition to autumn. The dahlias, the China asters and the late chrysanthemums are in the gardens, blooming at the right season, too, and these give a little of the autumnal aspect to village and home, especially where late autumn fruits are ripening on the trees, and Eastern elms and maples, planted along the streets, are shedding the yellow or brown leaf. But out among the hills it is scarcely so. The native trees, even to the oaks, are chiefly evergreen; and even such oaks as are really deciduous, retain their foliage in full color until the dark rainy days of December, baring their gray trunks and branches not until the ground beneath and around them is bright green with fresh growing grass like that of spring.

There are, nevertheless, some autumnal wild flowers in California; and even a few trees whose altered foliage imparts, in September, an autumnal aspect to the tree-clad slopes of all mountainous and hilly districts. Wherever, in the near or distant landscape, a patch of deep yellow comes out in contrast with the dark but vivid green of oaks and hays, one knows it must be a clump of the native maple (*Acer macrophyllum*), a tree distinguished from all others of its genus by the uncommon size of its leaves, which, in California, are half a foot broad on thrifty trees, in Oregon even larger. It nowhere makes up a forest, or even a small grove, by itself; only two or three in a place, or, at most, an interrupted succession of them, ranging up and down the course of a ravine or brook, are what one sees of this species in its native wilds. The foliage ripens and turns to yellow long in advance of the earliest frosts, so that before the equinox it is in its richest and decidedly autumnal garb.

In the higher Sierra only, and chiefly toward the northern boundaries of the State, occurs a smaller maple (*Acer glabrum*), the leaves of which acquire an almost crimson hue as the autumn days advance; but this species is never met with in the more settled, western regions of California, with which we are concerned. The only red leaves here are those of the wild grape (*Vitis Californica*) and of the everywhere too prevalent poison oak (*Rhus diversiloba*). This last is altogether distinct from its East American analogue, having foliage of firmer texture and more rounded outline. In its autumnal dress it is truly beautiful, but this is taken on, at least in some parts of the country, as early as August, before we begin to think of the fall of the year. The same is true of another small deciduous tree, the native horse chestnut (*Asculus Californica*), whose fading leaves of yellow and red-brown are efficiently autumn-like, in whatever more elevated districts they do not fall before the end of summer.

With aetere and golden rods, Pacific North America is not well furnished. In the western parts of California we have but two or three species of each; and the most common of the golden rods (*Solidago Californica*) is almost gone before the autumnal days begin. One of the aetere (*A. radulatus*), a white-flowered, low species, with a simple flat-topped corymb crowning the leafy stalk, is met with along the borders of roads and thickets, but scarcely elsewhere. This also comes near being a summer flower; but it is in pretty condition in the early part of September. The blue-flowered species (*A. Chilensis*) is taller and more showy, quite like some of the Eastern asters, and it flowers quite late, growing chiefly in low, half marshy grounds, not far back from the sea.

The characteristic autumnal wild flowers of California are the various species of Madia and Hemizonia, known in every-day life by the not very promising appellation of tarweeds. With an abundant resinous hairiness, such as most of the kinds are invested with, they are not pleasant plants to handle or to walk among; but they grow in masses, on open hillsides, by streamlets in the woods, in stubble-fields by acres, their white or yellow flowers giving color to miles of territory but only in the early part of the day; for their broad and handsome rays, at least those of most species, wither like the corollas of morning-glory, or four-o'clocks, as soon as the sun is in mid-sky. The tallest species (*Madia elegans*) is a strikingly showy, Coreopsis-like plant, altogether neat and graceful, however offensive its tar-like stickiness is to the touch. The rays, one inch long and deeply three-lobed, are of a lively yellow, with a velvety red base. The heads are borne loosely and somewhat pendently at the ends of slender, almost leafless branchlets, the main stem standing six feet high or more. No lover of things beautiful can fail to admire the uncommon grace and coloring of this Madia, as it lightens up the roadsides and banks of streamlets through miles of mountain forest.

Afar from the fields and waysides, in deep mountain shades, where, after the drouth of

more than half a year, the streamlets are still flowing, one may find in October fine masses of flowers and ferns; not strictly autumnal plants, yet such as, at least, have the faculty of putting forth just now a second and a truly autumnal display of color. Such are two or three species of *Mimulus*. We shall find no scarlet to match that of the *Lobelia* of Eastern brook-ides, but the *Mimulus cardinalis* is scarcely inferior to that; and the hanks of *Mimulus odoratus*, often two feet high, and seeming like an overgrowth, large-flowered and scentless musk mimulus, are a charming sight.

Another plant, one of the Saxifrage tribe (*Boykinia occidentalis*), with most elegant foliage and loose panicles of white or pinkish flowers, lingers in bloom from June until October. Here, too, the brilliant pendants of *Eucyninus* and the large red globes of coral berries (*Cornus Nuttallii*), and the falling acorns of the California evergreen chestnut oak, all shed their sweet influences, and make us feel that, even in California, there are autumnal days.

Rewards for Gold Discoveries.

The colonies of Australia have a system of rewarding the discoverers of new gold fields, which has worked well. Prospectors are evidently appreciated and encouraged there, and not by any means looked upon as tramps or idlers. Their vocation is one publicly acknowledged to be beneficial to the community. Encouragement is given them to explore remote regions, since, in addition to the value of any "finds," the Government pays them a stipulated sum.

It will be interesting for us to note the conditions under which rewards will be given for the discovery of new gold-fields in Victoria. It will be seen that, aside from the value of yield, the question of number of men given employment is taken into consideration. The conditions are as follows:

That person will be deemed the discoverer who shall first find gold, mark out a claim and notify the same in writing to the warden or police magistrate of the district. In such notification the discoverer shall state, as nearly as practicable, the exact locality and distance from the nearest gold working or nearest town.

No reward will exceed £1000. In fixing the amount to be paid for any discovery, regard will be had to the number of men employed on the new gold-field, its distance from the nearest gold workings, the character of the deposits in which the gold occurs and the depth of sink.

If two or more persons simultaneously discover gold in the same locality, or in places immediately adjacent, and they each severally comply with the conditions mentioned, the sum proper to be awarded will be divided among the several persons who have discovered the gold-field in such manner as shall be just.

Rewards shall be given in accordance with the following scale, namely:

A. For the discovery of a gold-field, distant more than one mile, and not exceeding two miles from the nearest gold workings, and on which there shall be employed, three months after the report of the discovery having been made, not less than 200 men, a sum not exceeding £200.

B. For the discovery of a gold-field, distant more than two miles, and not exceeding three miles from the nearest gold workings, and on which there shall be employed, three months after the report of the discovery having been made, not less than 200 men, a sum not exceeding £300.

C. For the discovery of a gold-field, distant more than three miles, and not exceeding five miles from the nearest gold workings, and on which there shall be employed, three months after the report of the discovery having been made, not less than 200 men, a sum not exceeding £400.

D. For the discovery of a gold-field, distant more than five miles from the nearest gold workings, and on which there shall be employed, three months after the report of the discovery having been made, not less than 200 men, a sum not exceeding £500.

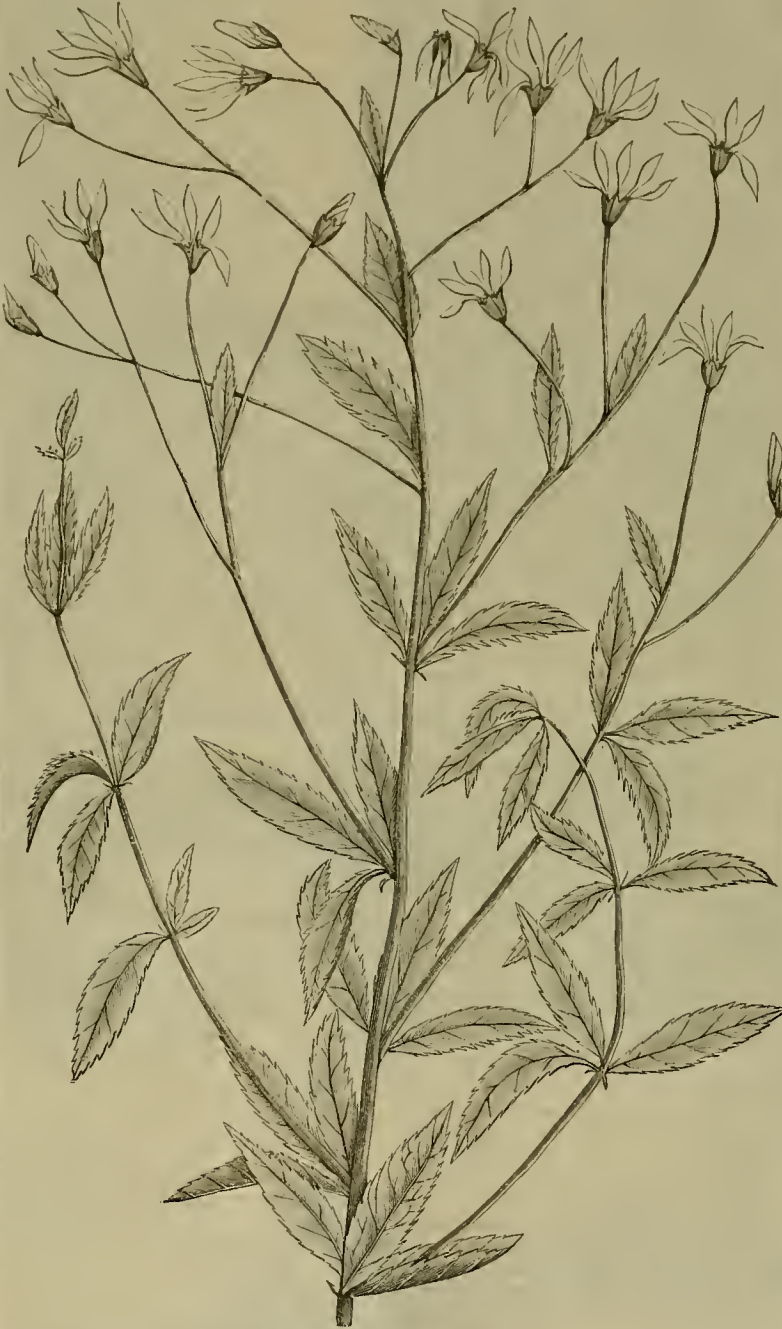
E. For the discovery of a gold field, distant more than five miles from the nearest gold workings, and on which there shall be employed, six months after the report of the discovery, not less than 500 men, a sum not exceeding £1000.

ALASKA'S RESOURCES.—Prof. Davidson of the United States Coast Survey has in Bulletin No. 4 of the United States Coast and Geodetic Survey dwelt upon the resources of Alaska and their development. He considers that the exigencies of the increasing trade demand that a thorough and exhaustive survey of the Alaskan coast should be at once proceeded with in order to enable mariners with data for their guidance. Tables exhibiting the statistics of the salmon, whale, codfish and fur trade are appended.

DREDGER PATENTS.—A. B. Bowers has commenced suit in the United States Circuit Court against Alexey W. von Schmidt, for an alleged infringement of dredger patents. It is averred on behalf of the complainant that on May 26, 1885, he was awarded a number of patents for improvements in the mechanism of dredgers. Since that time the defendant has, it is alleged, wrongfully made and used the new devices. An accounting, damages and an injunction are sought.

A Pretty Medicinal Plant.

We present herewith a medicinal plant of attractive appearance though of decidedly unattractive effect upon the system to which it is administered. The plant is known as "Indian physic" (*Gillenla trifoliata*) and is one of the series of native medicinal plants as drawn and described by Dr. Geo. Vasey, botanist of the Department of Agriculture. It is a perennial herbaceous plant, of the natural order *Rosaceae*, growing throughout most of the States east of the Mississippi river in shady, moist locations. It is most abundant east of the Allegheny mountains. The root consists of "many long, slender, brown branches, proceeding from a thick, tuber-like head." Usually several stems rise from the same root;



INDIAN PHYSIC—*Gillenla trifoliata*.

they are erect, slender, smooth, from two to three feet high, branched above, and very leafy. The leaves are in threes (trifoliate), each part or leaflet having a short stem or petiole, is mostly oblong or lance oblong in outline, or sometimes obovate, from two to three inches long, sharp pointed, and the margins have many sharp, close teeth. Most of the leaves are set close to the stem (sessile), and have at the base of each a pair of small linear-lanceolate stipules, like diminutive leaves, decreasing in size from below upward. The flowers grow from the upper branches on slender peduncles one to two inches long, and form a loose, open, corymbose panicle. The calyx is tubular bell-shaped, a quarter to a third of an inch long, with five small, erect teeth. The five petals are inserted on the inside of the calyx near the top. They are linear-lanceolate, three-fourths to two-thirds of an inch long, spreading, and of a white or pale rose color. The stamens vary from 10 to 20 in number, are small and inclosed in the calyx. There are five styles and ovaries, which are finally succeeded by five small pods, cohering at their base, separate above, each valve containing about two seeds.

The dried root is the part used medicinally, and is of an emetic and purgative nature. It

has been used as a substitute for ipecac. It was employed by the Indians, and from them the people of the colonies learned its properties. There is another species, the *Gillenla stipulacea*, which has essentially the same properties. It is gathered for commercial purposes to some extent in North Carolina.

Working a Gravel Mine.

We visited the rich gravel mine of Mr. J. R. Moffitt on the Tuolumne river last week and had the pleasure of seeing the gigantic scheme in full blast. Mr. Moffitt with characteristic genius and energy has tamed the river and now conducts the entire stream along the north bank in a flume 12 feet wide and 4 feet high. This water flows under and drives three large under-

virgin ground, and he therefore believes that there are millions in the uncovered earth. This is the richest gravel mine of which we have personal knowledge in the world, and it snuffly overthrows that theory which so often obtains, and which contends that the placers and river claims have seen their best days. There are fortunes yet in the placers and riverbeds of Tuolumne.—*Union Democrat*.

Comstock Bullion Yield.

Following is a statement of the ore and bullion product of the Comstock lode mines for the quarter ending Sept. 30, 1888, obtained from the official reports of the superintendents now on file in the assessor's office:

Consolidated California and Virginia.
Produced 30,126 tons of ore, yielding a total of \$682,218.26 in bullion; average yield per ton, \$22.75; actual cost of extraction, transportation and reduction, \$464,335; net yield above cost of production and subject to bullion tax, \$117,883; total bullion tax on the net proceeds, \$3436.49.

Confidence.
Produced 9207 tons of ore, yielding bullion valued at \$176,064.93; average yield per ton, \$19.25; actual cost of extraction, reduction and transportation, \$156,975; net yield above cost of production and subject to bullion tax, \$19,089; bullion tax, \$572.62.

Hale and Norcross.
Produced 6365 tons of ore, yielding bullion valued at \$171,941.80; average yield per ton, \$27; cost of extraction, transportation and reduction, \$141,065.72; net yield above cost of production and subject to bullion tax, \$30,876; bullion tax, \$926.

Yellow Jacket.
Produced 1370 tons of ore, yielding bullion valued at \$5765.36; average yield per ton, \$7.25; total cost of extraction, reduction and transportation, \$41,605; cost of production above yield, \$31,930. No tax.

Challenge.
Produced 1248 tons of ore, yielding bullion valued at \$24,170.81; average yield per ton, \$19.75; total cost of extraction, reduction and transportation, \$51,435.54; cost of production above yield, \$27,265. No tax.

Recapitulation.
The total number of tons of ore extracted during the above quarter, according to the above statement, was 28,316, producing bullion valued at \$1,064,158. The total products of the Savage and Chollar are not included in the above list, which will swell the total to \$1,175,900. The product of the last quarter of the current year is about \$940,000 below that of the preceding quarter, due to a lack of ore-crushing facilities.

Coast Survey News.

Important Work in Southern California—The Alaskan Boundary.

Prof. Davidson and Captain Lawson of the Coast and Geodetic Survey have gone to Los Angeles county, near Anahim, to make surveys for the location of a base line. This work will not be completed for several months. An appropriation of \$100,000 having been made by Congress for the purpose of running the boundary line between Alaska and British Columbia, J. H. Turner of the Coast Survey has been ordered here from the East to join the party that will be sent out next spring. Captain E. F. Dickens and party of the Coast Survey have just returned from the southern coast of Oregon, where they have been engaged since last May in prosecuting the work of the Coast Survey. During the season they made a topographical reconnaissance of the coast from Port Orford to Cape Sebastian, including the Rogue River reef, locating the position of several dangerous sunken rocks. They also made a topographical survey of the coast between Umpqua river and Coos bay. This party now expect to remain in the office here all winter, making up their report of this past season's work.

VALUE OF ENTERPRISE.—When times are good and employment not scarce, no one thinks of giving credit to those who have, by their energy and courage, hoisted up the enterprises which form the basis of prosperity. But when times are dull and no labor is to be had, then there is an expressed appreciation of such men. The man who risks his money in developing mining property, which in turn gives labor and supports communities, is never thought of till he quits operations. An appreciation of such efforts on the part of those who are benefited by it, stimulates to further effort. Nevada district needs men of hope, of pluck and capital, right now. Without them it will not prosper. Let what few we have be duly appreciated, so that others may be induced to take hold. We have the gold in the ground. When it is diligently sought, it will be brought to the surface in paying quantities. Every prospect started in the county means the expenditure of money by the operator, with the chances of losing it all. Every such prospecting enterprise gives labor and helps trade. All gain by it except the unlucky wight whose hopes induced him to risk his coin with the hope of developing the country and of gaining money for himself. All the encouragement possible should be extended such operators. Their work benefits every one and their enemies is equally beneficial to all.—*Nevada City Herald*.



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SAN FRANCISCO

Saturday Morning, Nov. 24, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Iron Stills for Acid; Under a High Head, 341. Passing Events; The Mining and Scientific Press; Heavy Copper Production; Cost of Mining Silver Ores; Discount on Silver; Something About Elevators, 344.

ILLUSTRATIONS.—Fig. 1.—Improved Modern Iron Still; Fig. 2.—Improved Still for Strong and Pure Acid; Fig. 3.—Section of Iron Pan and Still, 341. Indian Physico—Gillenia trifoliata, 343. The Ellithorpe Air-Brake Co.'s Passenger Elevator, Air-Brake Used on Ellithorpe's Passenger Elevator, 345.

CORRESPONDENCE.—Washington Territory Mines; Electric Lighting by Incandescence; Fleas, 342.

MISCELLANEOUS.—The Folsom Dam; California Woods in Autumn, 342. Rewards for Gold Discoveries; A Pretty Medicinal Plant; Working a Gravel Mine; Constock Bullion Yield; Coast Survey News, 343.

MECHANICAL PROGRESS.—American Mechanical Science in England; Iron in Structural Work; Popular Belief that Cold Makes Steel Brittle; Wheel Tires on Prussian Railways; Trouble With Piston Packing and the Remedy; What Metaline is, 346.

SCIENTIFIC PROGRESS.—Deteriorated Oxygen; The Progress Required to Solidify Powdered Metals; Personal Experience of an Electric Shock; Early Art in Various Localities; Unknown Sensations, 346.

GOOD HEALTH.—Monthly Health Report; Growing Tall by Exercise; The Oil Glands, 347.

USEFUL INFORMATION.—Fishing on Dry Lands; India Ink; Ancient Cities; Sugar as a Fire Kindler; Corn-Cobs Pressed into Building Blocks; Across Greenland, 347.

ENGINEERING NOTES.—Wind-Power for Electric Lighting; Propulsion of Ships by Air Propellers; A Canal Across Italy; A New Device for Utilizing a Current of Water, 347.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 348-49. **MINING STOCK MARKET.**—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 352.

Business Announcements.

(NEW THIS ISSUE.)
Mining Machinery—Vulcan Iron Works.
See Advertising Columns.

Passing Events.

The earthquake shook experienced around the San Francisco bay region on Sunday was the heaviest since 1871. There were six on the same day, the first being the heaviest.

Several parties are making preparations for observing the total solar eclipse which occurs on New Year's Day. All of these parties will use both telescopes and cameras, and it is hoped to obtain some good observations of the corona.

The miners who own gravel claims are anxious to learn the proposed manner of procedure of the recently appointed debris commission. It has not as yet met, all of the members not having come to the city. As soon as any plans are adopted we shall inform our readers what they are.

The rainy weather has continued most of the week and doubtless the ditches and streams are running full in all directions. The advent of the rain is welcomed in California by both miners and farmers.

Important work will soon be carried on in this bay, notably the extension of the seawall on the city front and the opening of the tidal canal at Oakland harbor. These works are of interest from an engineering point of view and will give employment to a number of contractors and workmen.

The Mining and Scientific Press.

Now that prospectors have gone into winter quarters and miners have long evenings to themselves, they have more opportunity for self-improvement than during the busy summer. There is more time for reading and finding out what other people are doing in other mining sections, what new regions are being developed, what new systems and processes are being tried, and what improvements are going on in mining, mechanics and metallurgy. There is no better way to find these things out than by reading the MINING AND SCIENTIFIC PRESS. It is the aim of the publishers and editors to collect everything of interest on these and kindred subjects and present them in suitable form to the readers of the PRESS.

Of late, several features have been improved in this paper. We have enlarged the scope of our market reports materially, giving more space and embracing a short review concerning such articles. These reports are specially arranged for mining readers, and, for that purpose, are the best published on this coast. Our illustrations are much more numerous than formerly, and this feature we intend to still further improve. Our list of correspondents has increased, and each week there are interesting and instructive contributed articles from various sources.

Those who are familiar with the PRESS would greatly oblige us by calling the attention of others to its merits in order that by extending our list of subscribers we may be enabled to add new features and improve the paper as occasion demands.

Heavy Copper Production.

Although it is said that the recent contracts of the French syndicate with various copper mines will restrict production to some extent, up to this time the copper product has been increasing, especially at Lake Superior, where the largest mines of this metal in the United States are located. The output last month amounted to no less than 5867 tons mineral from ten mines, against 4901 tons in October, 1887. The total for the past ten months is 45,018 tons, against 39,615 tons the corresponding period last year. The output of the mines is given as follows by the Boston Transcript:

	October 1888.	October 1887.	Jan. 1 to Oct. 31, 1888.	Oct. 1 to Oct. 31, 1887.
Tons.	Tons.	Tons.	Tons.	Tons.
Calumet & Hecla, 3,914	3,657	26,298	25,845	
Tamarack.....	955	501	6,236	4,439
Quincy.....	341	619	3,827	2,550
Atlantic.....	214	226	2,466	2,077
Oscoda.....	185	185	2,029	1,694
Franklin.....	181	188	1,824	1,982
Huron.....	125	103	1,194	715
Central.....	102	122	926	953
Kearsarge.....	100	...	273	...
Copper Falls.....	80	...	642	360

Total 10 mines...5,867 4,901 45,018 39,615

The most striking point in the October figures is the immense increase in the Calumet and Hecla's output, 516 tons more mineral having been produced in October than in September. The Calumet and Hecla's total output for the year to date is larger than the same period in 1887 for the first time this year.

The aggregate product of the 10 mines, representing all those at present actively producing, save the Allouez, was 5867 tons of mineral in October, against 5009 tons in September, and 4901 tons in October, 1887. There has been a steady gain in the amount of copper produced by the Lake Superior mines from month to month this year, under the stimulus of the contracts with La Societe des Mateaux. The total product of the seven mines producing in January was 3510 tons of mineral. In October the Lake output was 5867 tons, an increase of 67 per cent. The total October output of 5867 tons of mineral figures at fully 9,000,000 pounds of fine copper, representing a net profit to the mining companies over all expenses of producing, treating and marketing of fully \$700,000, while the total product for the first ten months of the current year of 45,018 tons of mineral figures at somewhat over sixty-seven and a half million pounds.

THANKSGIVING.—Before the PRESS comes to its readers again Thanksgiving Day will have passed by, and due observance will doubtless be made all over the country. Our mining friends particularly have reason to give thanks for a prosperous year, knowing as they do that the industry with which they are connected is doing well by them and improving in every way. In this State the abundant rains, so far, insure future prosperity and busy times.

Cost of Mining Silver Ores.

The Granite Mountain Mining Co. of Montana crushed during the last fiscal year 25,993 dry tons of ore, which yielded \$3,043,872, the mine being enabled to pay in dividends for the year \$2,200,000.

In view of these extensive operations the careful record of work kept is interesting and instructive. The two mills have been steadily at work, Mill B having commenced in February, 1887. A new 90-stamp mill will soon be added. The record of mill work is as follows:

Mill A, crushed in wet tons.....	8,703,104
Mill B, crushed in wet tons.....	16,912,494
Amount of salt used.....	25,615,598
	3,250,700
	28,976,298

Number of dry tons.....	25,993,050
Assay of ore, Mill A.....	145,939
Assays of tailings A.....	9,352
Per cent saved.....	94,418
Assay of ore, Mill B.....	122,827
Assay of tailings B.....	9,872
Per cent saved.....	92,925
Number of Dore bars.....	1,916
Number of ounces pure silver.....	3,168,507.04
Number of ounces pure gold.....	1,776,260
A mill in service.....	341 1/2 days
B mill in service.....	343 1/2 "
A mill crushed 3 stamp, 7 day of 24 hrs.....	1,012 tons
B mill crushed 3 stamp, 7 day of 24 hrs.....	1,102 "
A cost of milling, per ton.....	\$12.298
B cost of milling, per ton.....	11.335
Average cost both mills combined.....	11.684

The most interesting feature of the work to a millman, however, is the analysis of cost of treating one ton of ore in Mill B, where a careful record was kept. The analysis is as follows:

	LABOR.	Am't.
Superintendence.....		\$0.3529
Millwrights.....		1.053
Engineers.....		1.090
Firemen.....		1.268
Crushermen.....		1.173
Dryermen.....		1.043
Roastermen.....		1.374
Salt rolls.....		1.465
Batterymen.....		1.177
Battery helpers.....		1.371
Cooling floor.....		3.007
Panmen.....		1.676
Pan-helpers.....		4.939
Dustman.....		0.940
Retortman.....		0.743
Laboratory assistant.....		0.740
Storekeeper.....		0.984
Watchman.....		0.673
Mill-repairer.....		0.630
Sundry labor.....		2.225
Total.....		\$3.5890

	FUELS.	Am't.
Castings.....		\$0.7037
Wrought iron.....		0.054
Lubricants.....		0.044
Iron nails.....		0.042
Charcoal.....		0.005
Quicksilver.....		0.712
Shovels.....		0.009
Belt.....		0.009
Chemicals.....		1.328
Salt.....		2.875
Fuel.....		2.627
Team account.....		1.121
Blacksmith account.....		2.079
Sundry supplies.....		1.219
Total.....		\$7.7960
Labor.....		3.5400
Total.....		\$11.335

It will be seen by this that by far the largest items are cost of salt and fuel. Records of this kind are very useful for reference and comparison, but they are very seldom kept in such detail by those in charge of mills.

Discount on Silver.

To show how the discount on silver affects mining operations, the record of a single mining company for a single year may be taken. The Granite Mountain Co. of Montana received from the sales of their silver, during the past fiscal year, 94.48 cents per ounce. The difference between the average price for which they sold their product and the price at which the Government sells it to the people has been 34.8 cents per ounce, and on the 3,162,972 ounces produced and shipped by this one company, their compulsory contribution to native and foreign monometallists has been \$1,100,000 for the fiscal year. The president of the company calls attention to this very forcibly in his annual report. The free coinage of silver would give silver-producers 36 per cent more than they now receive, and which now goes to swell the Treasury surplus. The Treasury of the United States pays for silver at the market value of bullion, say at the rate of 95 cents for a pure ounce, at which rate 37 1/2 grains of pure silver in a standard dollar costs the Treasury about 73 1/2 cents, from which it will be seen that the Treasury makes, say 26 1/2 cents on every dollar coined, or a profit of over 36 per cent out of the people.

FREEMAN'S DRY-PROCESS SEPARATOR.—In answer to several inquiries we may say we have written to find the exact address of Mr. J. B. Freeman, and on receipt will publish it in the PRESS.

Something About Elevators.

[NUMBER 4.]

On the opposite page are engravings of an elevator safety brake and of the Ellithorpe Air-Brake Co.'s passenger elevator. The car of the passenger elevator is driven by the operation of a hydraulic engine, which, by its slow, noiseless and limited movement, raises it at any speed up to 250 feet per minute. The action is simply the inverse action of the common tackle-block, which multiplies the power by the number of sheaves to raise a larger load through less space. In this the power is divided by the number of sheaves to raise less load through a larger space. The number of sheaves will vary from 4 up to 12. The action of this water, which may be used from the street mains if the pressure be sufficient, is controlled by a hydraulic valve and operated by the car attendant. To raise the car, the water is let in to one end of the cylinder; this acts upon the piston, which is forced forward with its connection and cross-head carrying one set of dividing sheaves. Upon a fixed shaft at the other end of the cylinder is another set of sheaves.

The wire cables are attached to the cylinder rigidly, then pass under and over these two sets of wheels (as seen in the cut), then up to the top of the hatchway, over carrier wheels and down to the car.

When the engine is extended to its full length, the car is at the top, the valve is closed, and the car is sustained at the top by the water in the cylinder. The action of the valve having reversed, the car descends as fast or as slow as the water is discharged from the cylinder. The car is self-stopping at the bottom and top by its own movement, operating the shafting cable, but as a further preventive of accidents, additional stops are placed on cylinder, which allow the piston to travel only the distance necessary for the total travel of the car.

A water register is attached to the cross-head, which accurately measures the number of cubic feet or gallons, according to the travel of the piston.

Having thus briefly described the motive-power for raising and lowering the passenger car, we now refer our readers to the cut which illustrates the improved air-brake and air-enshion, and before giving some wonderful accounts of its positive action in danger, let us look into its mechanical construction.

No. 1 in the cut shows the cast-iron box through which the levers (2) pass; upon the top of the levers are the jaws (3) that grip the guide ways (4); the fulcrum-pins are shown by dots through the lever-box; this box is firmly bolted to the top or bottom of the cage, as may be most convenient.

The screw shaft, A, has upon one end a right-hand thread, upon the other side, a left-hand thread; the nuts B-C contact the levers upon either side; S is a spool upon said shaft, around which the cable G is coiled; 7 is a short cable connecting at the eye with cable C; cable 7 has upon its end a center pulling-hook, G, which slips under the end of the spring, F. Now follow the cable G over to the air-tube or box, C, where it attaches to the plunger, B; this air-tube extends from top to bottom of the elevator shaft; it may be contiguous to the shaft or remote from it, and should be from six to seven inches inside. The cord G passes over sheaves at the top. The operation when the elevator is running is this: Whenever the elevator goes up, the plunger B descends, and vice versa; the plunger B is made to fit the tube loosely, leaving a freedom upon each side of 1/2 of an inch; while the elevator is descending, the air in the top of the tube must pass by the plunger as it rises, producing a pressure upon the plunger of, say 1/2 pound to the square inch; but if from any cause the elevator should descend faster than is intended, a corresponding pressure of the air upon the plunger communicates the additional strain to the cord 7 and the hook G, and will instantly detach the hook from the spring F, instantly throwing the whole force upon the spool S, rotating the shaft A, thus spreading the levers S by means of the brass nuts B-C; engaging the jaws S-S with the guides 4-4; producing a friction of great force through the combined power of the screw and lever. The force will bring the cage to a stand within five or six feet without concussion.

Patent Air Cushion.

In addition to the air-brake, elevators of this manufacture are provided with an appliance

called the air cushion, which is placed under the cage or car at the bottom of the shaft. It is provided with suitable relief valves and is constructed in a novel manner and is claimed to be absolutely safe.

The cage can be raised to a height of 130 feet or more and loaded with tons of pig iron, eggs, glassware, plate-glass standing on edge or flatways, glasses filled with water, passengers, etc.; the safetys can be removed and the rope cut, allowing the cage to fall to the bottom, when, striking the cushion, the cage gradually stops, so that not an egg will be broken or a drop of water spilled or a passenger hurt or jarred. A cushion of this description will be placed under the passenger elevator now being constructed by this firm for the new Barker building on Sixth street, corner of Jessie. A public test of same will be made.

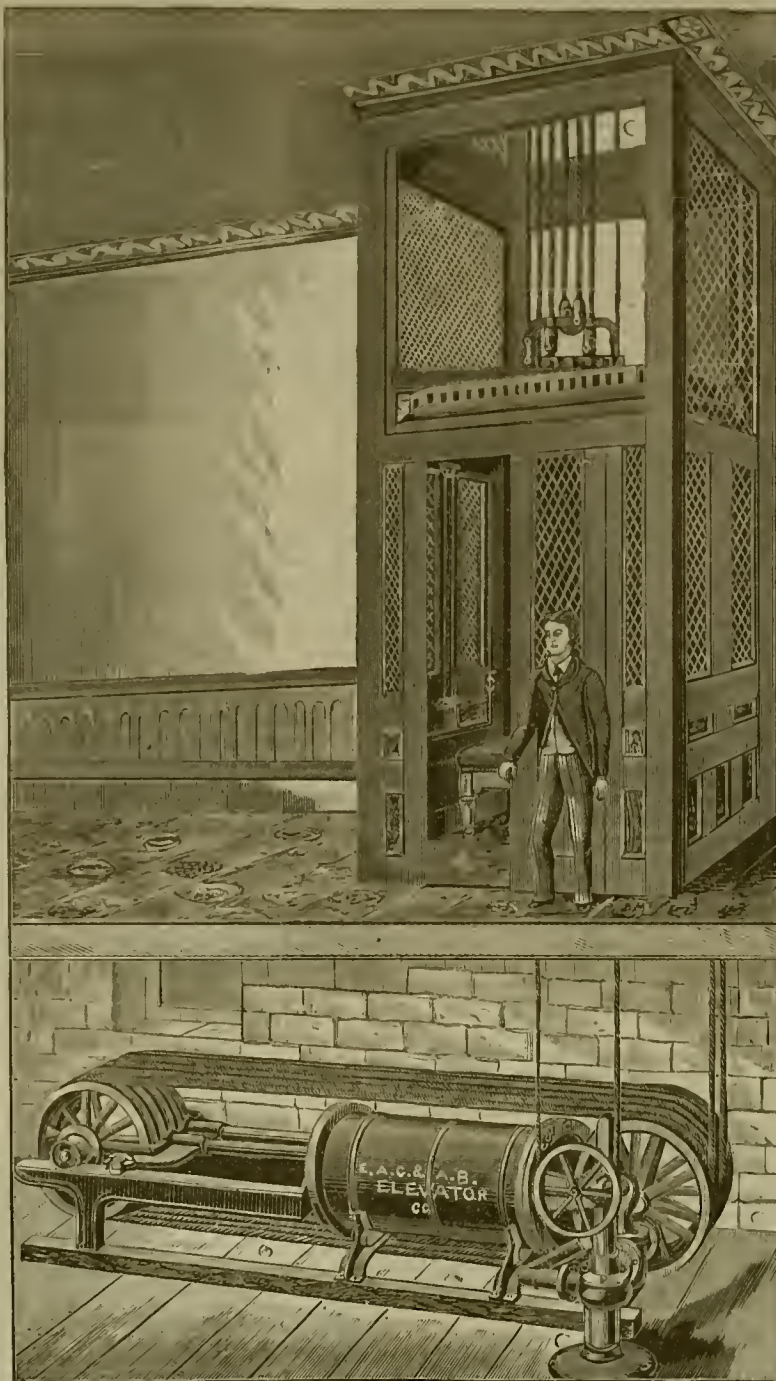
Very successful tests with this appliance have been made in other cities. In one instance an elevator with six occupants was allowed to drop 109 feet. In this case the weight of elevator and people was 2800 pounds, but the occupants all walked out safely after the rapid trip. At the New Orleans Exposition the elevator, cut loose from all cables, was allowed to drop 125 feet, but neither the occupants, nor building were in any way injured. These experiments have been tried a number of times under varying conditions of weight and height, and always with success.

Col. Ellithorpe has probably devoted more thought to secure absolute safety in the use of elevators than any other inventor in this line. No other inventor has taken the bold position that he could drop a car and its load, weighing four, five or six thousand pounds, from an elevation of from 50 to 150 feet, through the open air, with all the force that the law of gravity could carry it, and land it safely at the bottom, by simply resisting the weight and its terrible momentum, by interposing nothing but the common atmosphere. This he has successfully done in many prominent cities. This success has won for him confidence, and we shall look forward to the promised exhibition of the new elevator now being placed at the Union Club and the Barker building in San Francisco with considerable interest.

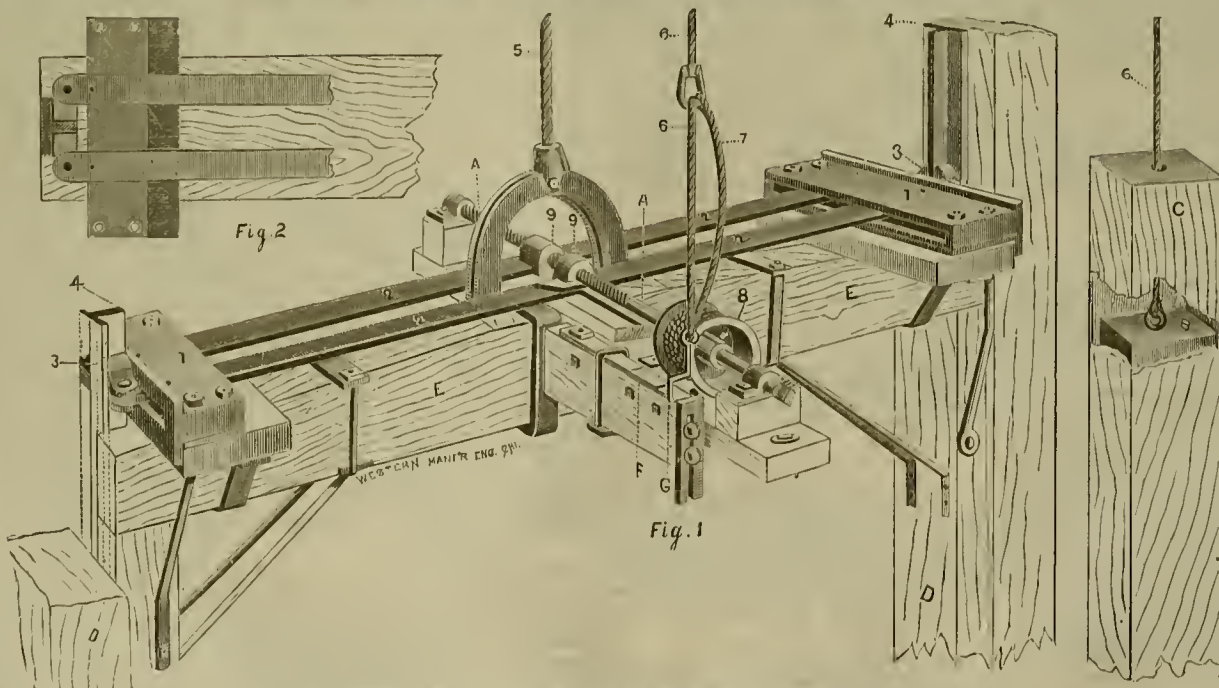
These elevators and safety appliances are built by Wm. H. Birch & Co., 119 Beale street, who have secured the patent rights for this coast. They also build all kinds of elevators, including hydraulic rams, sidewalk, worm-gear, steel screw, steam, pur-gear and hand-power elevators. S.

ALASKA MINES—The Governor of Alaska in his report says that the stamp-mills on Douglas island are the largest in the world, and have an estimated output of \$150,000 in gold per month. Other gold mines are being developed on the same island and the report notes the sale of four claims for \$1,500,000. Promising silver discoveries have also been made. The Governor thinks there is enough coal in the Territory to supply the whole of the United States for centuries.

THE Spokane Falls Herald says that the strike of silver chloride on Lake Pend d'Oeille, opposite Hope station, promises to be a very important one, and adds another tributary mining district to the many that surround Spokane Falls. The easiest method of reaching the mines is to leave the Northern Pacific at Hope; here a small boat transports men and supplies across the lake, a distance of 20 miles. The landing-place is at the Squaw Bay Lime Kilns; from this point it is 30 miles to Weber's camp by land.



THE ELLITHORPE AIR-BRAKE CO'S PASSENGER ELEVATOR.



AIR-BRAKE ON ELLITHORPE'S PASSENGER ELEVATOR.

A SHOAL at a depth of 35 fathoms has been found 35 miles southwest of the Farallones islands. It is not marked on the chart and is supposed to have been formed by the earthquake of Sunday last.

It is estimated that the bullion yield of the Comstock lode next month will not fall short of \$900,000, provided there is water sufficient to operate all of the Carson River mills and the Nevada mill electric motor proves a success.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Deway & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Deway & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING NOV. 13, 1888.

- 392,601. — ORR-CRUSHER—J. M. Bryan, S. F.
392,800. — PLATE AMALGAMATOR—A. Gauthier, Grass Valley, Cal.
392,866. — VEHICLE—J. G. Kenyon, Port Kenyon, Cal.
392,750. — PAPER FILER—A. C. A. Perkes, Portland, Ogn.
392,998. — CAR-COUPLING—Pickard & Nelson, Eugene City, Ogn.
392,701. — BUTTON FASTENING MACHINE—A. Stillmoller, S. F.
392,894. — BASE-BURNER STOVE—E. R. Thomas, S. F.
392,768. — PIPE—G. H. Warriman, Montecino, W. F.
18,730. — DESIGN FOR BADGE—A. M. Ebbots, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Deway & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Deway & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DESIGN FOR A BADGE.—Arthur M. Ebbots, S. F. No. 18,730. Dated Nov. 13, 1888. The leading feature of this design is the center-piece in the form of a grizzly bear, encircled by a rim-piece in the form of a laurel wreath. In connection with this is a star at the top of the rim-piece and a scroll plate below the center-piece and encircling the wreath. On this plate is the word "Pioneer." This is intended for a badge for the members of the Society of California Pioneers.

VEHICLE.—Jacob G. Kenyon, Port Kenyon, Humboldt county. No. 392,866. Dated Nov. 13, 1888. This invention consists in the novel construction and arrangement of independent axles or wheel spindles, their bearings, supports and other details. The friction is reduced indirectly by the anti-friction bearings, but also by transferring the friction from the wheel centers, where it usually is in vehicles, to the journals of the spindles. Steadiness and ease of draft are obtained by so mounting the wheels as to more effectually prevent their deflection from a straight line. In the ordinary construction, each wheel being rotary on its spindle, there is a constant tendency to deflection, either by reason of small obstructions or natural looseness, and this tendency produces a cramping and consequent friction which affects the draft; but in this patented construction the inventor claims that each wheel is better controlled by its axle or spindle, which, serving as a lever, is sufficient to resist the deflecting tendency and to keep the wheel perfectly straight.

CONCENTRATING SULPHURETS.—The Virginia Chronicle says: Many new strings of blanket sluices have recently been constructed in Six-

Mile canyon for concentrating sulphurets contained in tailings flowing into the creek from the California and other mills. Con. Cal. and Virginia ore is worked up to above 90 per cent of the pulp assay value, and the tailings from the mill are therefore very thin, but when the Nevada mill begins dropping its 60 stamps the blanket sluicemen expect to make more than minor's wages, as the percentage of loss on Hale and Norcross and Chol-lar ore worked in that mill is greater than that on Con. Cal. and Virginia ore.

At the meeting of the Academy of Sciences on Monday

evening, F. Gutzkow read a paper on "Magnesium Oxochloride, or Sorels White Cement—Favorable Conditions for Making It in California." W. R. Bentley read a paper on "Great Glacier of the Selkirks."

MECHANICAL PROGRESS.

American Mechanical Science in England.

A meeting of the British Association for the Advancement of Science was held in England last month, at which several papers were read, in which the position held by the United States in the matter of applied science in comparison with other countries must be peculiarly gratifying to every American. Much interest was awakened by the exhibition of the phonograph and graphophone, but the most intense interest was manifested when the lately discovered system of

Welding by Electricity

Was exemplified before the audience. The speaker on the occasion was Prof. Ayreton, who had for his subject "The Progress of Electrical Science." In the course of his lecture, a modest young American, Wm. Fish, stepped forward, at a nod from the professor, put two pieces of bar iron, an inch square, into one of the Boston electric welding machines, turned on the electricity, and in a few seconds the pieces so held together, end to end, became white by the intense heat and were made one directly in view of the astonished audience. The act called forth a tremendous round of applause. The young man next put two pieces of gas tube, one inch in diameter, into the machine, and, as the enthusiastic youngsters say, "in less than no time" it was seen that gas coupling could be dispensed with. "Steel is much harder than iron," said Prof. Ayreton. "Possibly, the current may not be strong enough to weld steel, for the engine which drives the dynamo is away off on the other side of the railroad shop, but our American friend will see what he can do with two pieces of steel three-fourths of an inch square."

The audience stood on tiptoe. "Down, down!" shouted those in the rear, but those on the front seats were deaf to all sounds, and intensely alive to what was going on in front.

A half-minute, and then Prof. Ayreton held up the welded steel, white with heat, and the building again broke with applause.

"Aluminium is a metal requiring an intense heat to weld it. Indeed, it cannot be welded except by electricity or the oxy-hydrogen process," said the professor, "and possibly the next experiment may fail," but the Boston electric welding machine was equal to the occasion, and the people went wild when they saw it glowing with whitest heat, the two pieces perfectly joined.

"Never have I seen," said Sir William Thompson, the versatile electrician, "an exhibition of applied science surpassing this in interest. I can see that its outcome is to be a revolution in our industries. It does what never had been done before, and what it was impossible to do by any appliance hitherto in use."

Another paper which awakened great interest was a description of Cowles' American process of electric smelting, obtaining aluminium by using a dynamo, as at Lockport, Ohio. An English gentleman has established works at Milton-on-Trent, using the same process. As aluminium is coming largely into use as an alloy with other metals, the practical members of the association—those who have interests in iron manufacture—pricked up their ears when it was stated that an American manufacturer of stove was using 60 tons of metal a day, in which there was a mixture of aluminium. The gentleman who read the paper said he was not at liberty to say how cheaply aluminium would be obtained by the Cowles process, but it was very cheap.

Still another paper was read showing the wonderful progress which had been made in this country in the way of electric lighting. It appeared to be very freely acknowledged that the United States was far ahead of England in the practical application of electricity to the industries.

IRON IN STRUCTURAL WORK.—In walls, brick of any kind, but more particularly fire-brick, if properly laid in sound mortar or cement, will resist all effects of heat for a considerable time. For stoves, stone is a very dangerous material, unless it is imbedded on some substance which can carry it when it becomes hot. But of all building material there is none which requires more extra care and delicate treatment than iron. Imagine a straight iron rod, supported at its ends, and capable at the ordinary temperature of the atmosphere of carrying a heavy weight in the middle. Let a strong fire be lighted under it; in a few moments the rod will lose its straightness, first sagging in the middle, then dropping altogether, next flaring and running away. Yet this is a material which many persons call fireproof, and put to carrying loaded floors which they designate by the same improper epithet. Wherever iron is used it should be protected by terra-cotta, good brickwork, sound plastering, or if nothing better can be found for the purpose, solid woodwork round it. Woodwork, if solid, will resist for a length of time every possible effort of actual flame.—*Builders' Trade Journal.*

BRASS-ROLLING IN PHILADELPHIA.—Philadelphia is to have a brass-rolling mill. Connecticut has always been the seat of all the large brass-rolling mills of the country. The first copper mines were worked in Connecticut, and since copper and zinc are the component parts of brass, the brass industry was naturally lo-

calized. But the Connecticut copper mines were shut down, and all the copper and zinc, or far the largest part of it, comes from the exhaustless copper deposits of Lake Superior and the zinc mines of Illinois and adjacent States. Pennsylvania finds use for much coal in the industry, and it is estimated that \$20,000,000 worth of rolled brass is consumed in Philadelphia yearly. Waterbury is the great brass-rolling center of Connecticut, and there are also establishments in Ansonia, named after Anson Phelps, the founder of the famous New York metal house.

Popular Belief that Cold Makes Steel Brittle.

Stiffs, Fairhair, Kirkaldy, Webster, the United States Government Commission, the Railroad Commissioners of Massachusetts, and others, all hold that the effect of low temperature upon iron is very slight, and that it does not tend to produce a brittle condition. Sanberg is the only one who claims that low temperature have any pronounced effect in producing brittleness; that is, he is the only one among recognized authorities; but if you have ever been out in the woods on a cold, frosty morning, you may have noticed that the axman warms his ax before beginning work; ask him why he does so, he will reply, "To take the frost out."

Watch the trackman on a cold morning; he is very careful not to strike his cold chisel too hard, and neither does he cut so deeply into the rail, before dropping it to break it, as he does in warm weather; ask him why, he will say, "The chisel and rail are full of frost and will break more easily than in warm weather." The same thing will be noticed with the men who are unloading steel rails, or wheels and axles. They are more careful to let them down easily in cold than they are in warm weather.

You may say, "But that is only a popular fallacy." It may be so, but those men have had some experience which has led them to this opinion, and I am afraid there is more truth than fallacy in their claim "that frost in the iron makes it brittle."—*Ramsay on Effect of Cold on Metals.*

WHEEL TIRES ON PRUSSIAN RAILWAYS.—According to the official statistics of the Prussian railway authorities, there have been during the past year 2552 breakages of wheel tires on the 33 line systems in Prussia of about 37,400 km. in length. In consequence, there were 20 cases of the train leaving the rails and 191 cases of delay. The following were the various causes of the springing taking place: Badness of the material, low temperature, and rapid change of temperature. Concerning the great danger which the springing of wheel tires occasions, the railway authorities are, of course, endeavoring to find some means of obviating all defects by employing the best material and making the tires of great thickness. Formerly the tires were 25 mm. in thickness; now they are given a thickness of 60 mm. and many are constructed of pure weld iron. The breakages have, as a fact, considerably decreased since 1886, in which year 4740 were reported.

TROUBLE WITH PISTON-PACKING AND THE REMEDY.—A correspondent of the *American Machinist*, in speaking of the wearing of the bottom part of a cylinder, says: "I am running a Cammer engine—cylinder 16x36; 100 revolutions per minute. The three first years it ran, the piston-head wore out the bottom of cylinder so much more than the top or sides that it had to be bored out twice, and three different packing-rings tried, with the same results. At last, we extended and ran the piston-rod through the loose head, so it now has an equal bearing each end of cylinder. The result is a great saving of oil, engine ran 13 months, day and night, without visible wearing of cylinder, and without renewing packing."

WHAT METALINE IS.—Metaline is the "trade-mark" name given by the inventor, Dr. Stuart Gwynn, to a series of substances, containing in themselves sufficient lubricating properties to preclude the necessity of using oil or other lubricants, and to him is due the credit of rendering possible and first introducing this new system of journal bearing. The patentee is R. W. Rhodes, 37 Bleeker street, New York. It is considered especially valuable for loose pulleys and all places difficult of access, or liable to be overlooked.

A NOVEL LOCOMOTIVE is on exhibition at Palmyra, Wis. Except the noise of its wheels moving upon iron rails, it is noiseless and smokeless. The steam, after use in the engine, is condensed in a new manner, and the water at the boiling point is reused. All the wheels of this locomotive are drive wheels, being so arranged as to give them easy control of the car on curves and uneven tracks.

IMPROVEMENT IN THE BLOOMING MILL.—In the Soho mill of the Moorhead-McCleane Company, the blooming-mill will be thrown aside by an improvement which dispenses with one process in converting the blooms into sheets. A kelp-mill and a merchant-mill will be added to the establishment.

ONE pound of mercury converted into fulminate is efficient to charge 50,000 percussion caps.

SCIENTIFIC PROGRESS.

Deteriorated Oxygen.

It is a curious fact, discovered by Dr. B. W. Richardson, that pure oxygen becomes devitalized by repeated inhalations. Animals confined in a current of freshly-made pure oxygen were differently affected, but never became sleepy; but when the oxygen once inhaled was freed from all known impurities and again supplied, the animals invariably became drowsy, fell asleep, and under successive inhalations of the purified gas, expired. It was evident that, in breathing, the oxygen had undergone some change unknown to the chemist. What the change is can only be conjectured, though Dr. Richardson has found that if the exhausted oxygen be electrically charged it is revitalized and will again support life.—*Boston Journal of Commerce.*

[The deteriorated oxygen, which as above, would not sustain life, was no doubt deprived of its ozone by being repeatedly passed through the lungs of the animals employed in the experiments. Its subsequent subjection to the action of electricity would restore its ozone and thus revitalize it. It is well known that ozone is always abundantly developed in the atmosphere immediately after a thunder-storm. After such atmospheric disturbance it is readily recognized by its peculiar smell and the invigorating influence it exerts on the human system. Ozone is an allotropic state of oxygen. Common oxygen is passive, but when it exists in its allotropic condition as ozone it is active, invigorating, life-giving. In its ordinary condition even pure oxygen contains but a very small proportion of ozone, and from the above experiments it loses even that by repeated inhalations, and becomes unfitted to sustain life; but, when subsequently subjected to the action of electricity, ozone is abundantly developed and the oxygen again becomes fitted to sustain life. These facts undoubtedly afford an explanation of the "curious fact" alluded to by our Boston cotemporary, which was probably not recognized by the "chemist" who made the experiment.—*Eds. Press.*]

The Pressure Required to Solidify Powdered Metals

In his Cantor lectures, delivered last March, Prof. Chandler Roberts Austen dealt with the formation of solid metals by compressing strongly the powders of the constituent metals. Since 1878 the labors of Prof. Walthers Spring of the University of Liege have been mainly devoted to the study of the effect of compression on various bodies. The particles of a metallic powder left to itself at the ordinary atmospheric pressure will not unite, but by augmenting the points of contact in a powder, the result may be very different. Prof. Austen's experiments were made with the aid of a compression apparatus, in which the metallic powder is placed under a short cylinder of steel, in a cavity in a steel block divided vertically, held together by a collar. The pressure is applied to a cylindrical rod. Under a pressure of 2000 atmospheres on the piston, or 13 tons on the square inch, lead, in the form of filings, becomes compressed into a solid block, in which it is impossible to detect the slightest vestige of the original grains; while, under a pressure of 5000 atmospheres, lead no longer resists the pressure, but flows as if it were liquid through all the cracks of the apparatus, and the piston of the compressor descends to the base of the cylindrical hole, driving the lead before it.

The more interesting results were obtained by Spring with crystalline metals. Bismuth, as is well known, is crystalline and brittle, yet fine powder and bismuth unite under a pressure of 6000 atmospheres into a block very similar to that obtained by fusion, having a crystalline fracture. Tin, when compressed in powder, unites, and if it is made to flow through a hole in the base of the compression apparatus, the wire so formed sometimes, though not always, emits the peculiar "cry" of tin when bent. The following figures show the amount of pressure required to unite the powders of the respective metals. Lead unites at 13 tons per square inch, tin at 19, zinc at 38, antimony at 38, aluminium at 38, bismuth at 38 and copper at 33 tons. Lead flows at 33 tons per square inch, tin at 47 tons.

PERSONAL EXPERIENCE OF AN ELECTRIC SHOCK.—Thinking some of the readers of the *Electrical World* might be interested in a personal experience of a shock by an intermittent current, I will give an account of one that occurred to me. On touching two terminals to close a circuit on some experimental apparatus, I thought, of course, I had grasped the insulation, but the bare end of a flexible wire managed to touch my right-hand finger while I held the binding screw in the other hand. I was instantly thrown down and held perfectly rigid, unable to speak, it seemed to me, for two or three minutes, but probably 20 or 30 seconds would be nearer the actual truth. I felt unconsciously coming on, when suddenly I became

loosened and I lay perfectly limp a moment or so. I got up, but was scarcely able to walk, the pains being greatest in the hips. However, I got a voltmeter and found 140 volts on the circuit, and the alternations or intermittences were 150 per second, while I found my resistance, under the same conditions, to be 4500 ohms. The wire that slipped out of my hand left a burn on my forefinger in the shape of an elliptical hole about 5.32 inches deep, and scarred the flesh about the hole at a radius of one-quarter inch. During the contact I felt difficulty in breathing, but five minutes afterward my skin was all aglow, as if a bath brush and Turkish towel had been used vigorously, while the respiration became full and a trifle quickened. Two days afterward I was all right except a little soreness all over.—*Electrical World.*

Early Art in Various Localities.

No words can adequately describe the decorative richness and the mechanical perfection of such illuminations as those which so thickly crowd the Book of Kells in the Trinity College Library at Dublin, or the Gospels of St. Chad, now in the Chapter Library at Lichfield. The ingenious intricacy of the various interlaced patterns are not only aesthetically beautiful, but give one also a sort of intellectual pleasure akin to that derived from a clever mathematical problem, when one traces the unerring accuracy with which the various strands of the design cross and wind and knot with one another without a false line or an impossible plait occurring anywhere.

One thing is clear about these marvelous patterns, and that is that they were produced by men who were themselves familiar with the working of gold jewelry; motives of ornament clearly derived from gold wire twisted into complicated patterns, are very frequent in the manuscripts, and these very patterns are to be seen in some of the no less wonderful jewelry of early Celtic times.

In the art of prehistoric Greece, exactly the same interchange of motives is to be seen—designs which grew naturally out of the technique of one art were copied in another and quite different class of work. Thus, for example, we see the wire spirals of the jeweler reproduced in the stone reliefs of Mycenae and Orchomenos, and at Tiryns on the walls of the ancient palace were paintings in which every detail, down to the semblance of a fringe along the border, was copied from loom patterns or woven stuffs. The fact is, that man of all ages and of all countries, while passing through a similar stage of artistic development, is led not only to use the same methods of execution, but even to produce the most closely similar designs.

Certain combinations of spirals repeated in geometrical patterns of almost exactly the same type, occur on the gold bosses of pre-Homeric Mycenae, on many pages of seventh and eighth century Irish manuscripts, and among the ornaments of the prehistoric races of Northern America—a curious proof of the general sameness of the human brain, and of the strong tendency which the peculiarities of necessities of certain handicrafts have to suggest certain forms of decoration to the mind of the worker. One peculiarity of the early Celtic illuminations is the absence of gold, either as a ground or as forming part of the pattern. The extreme richness of their effect is produced by the use of color only, and among them it is interesting to find a gorgeous purple carlet, which appears to be a form of the old murex dye, for which the ancient Phoenicians were so celebrated. The murex used by the Celtic scribes can hardly have been imported from Syria, and it is probable that they possessed the secret of extracting the dye from some shellfish which no doubt is still to be found on the coasts of Britain or Ireland, though its special value as a source of pigment has been forgotten.—*Ex.*

UNKNOWN SENSATIONS.—Sound is the sensation produced on us when the vibrations of the air strike on the drum of our ear, writes Sir John Lubbock in the *Popular Science Monthly* for November. When they are few, the sound is deep; as they increase in number, it becomes shriller and shriller; but when they reach 40,000 in a second they cease to be audible. Light is the effect produced on us when waves of light strike on the eye. When four hundred millions of millions of vibrations of ether strike the retina in a second, they produce red, and as the number increases the color passes into orange, then yellow, green, blue and violet. But between 40,000 vibrations in a second and four hundred millions of millions we have no organ of sense capable of receiving the impression. Yet between these limits any number of sensations may exist. We have five senses, and sometimes a fancy that no others are possible. But it is obvious that we cannot measure the infinite by our own narrow limitations. Moreover, looking at the question from the other side, we find in animals complex organs of sense, richly supplied with nerves, but the function of which we are as yet powerless to explain. There may be fifty other senses as different from ours as sound is from light; and even within the boundaries of our own sense there may be endless sounds which we cannot hear, and colors as different as red from green, of which we have no conception. These and a thousand other questions remain for solution. The familiar world which surrounds us may be a totally different place to other animals. To them it may be full of music which we cannot hear, of color which we cannot see, of sensations which we cannot conceive.

GOOD HEALTH.

Monthly Health Report.

Reports have been received by the State Board of Health from 79 localities which return a mortality for the month of October of 902, in an estimated population of 726,850, giving the remarkably small annual death rate of 14.88. This is probably a lower percentage of deaths than will be found in any State within the Union for the month of October. The deaths for the month from infectious diseases, including typhoid fever, did not reach one-tenth of the total mortality, which shows how remarkably free the State is from any epidemic disease with a fatal tendency.

Consumption, as usual, holds the highest place in our mortality record, 143 deaths being attributed to it, an increase over the previous month.

Pneumonia also shows an increase, having caused 47 deaths in October. This may be attributed to the meteorological changes during the month, causing an increased number of persons to be attacked by the disease rather than to any malignity in its type.

Smallpox caused two deaths, both in San Francisco.

Typhoid fever had a fatality of 36, which is a decrease from last report.

Cancer was fatal in 18 instances.

Prevailing Diseases.

Reports received from 84 localities are singularly united in the assertion of the reporters that there was no sickness worth speaking of in their several fields of practice, and this assertion seems founded upon fact when compared with the reports of mortality from acute disease.

Cholera infantum was observed in many localities in sporadic form, and is mentioned in reports from Wheatland, Elsinore, Lodi, Bakersfield, Colfax, Gonzales, Nevada City, Anaheim, Los Angeles, Oakland, Pomona, Salinas, Sacramento, Santa Ana, Santa Rosa and San Francisco. The season is late for this disease to be so prevalent, but may be owing to the increased temperature over normal that prevailed throughout the month.

Diarrhea and dysentery seem also to have been quite marked in several localities. In Sacramento, Nicolaus, Cedarville, Brownsville, Wheatland, Merced, Lakeport, Lockeford, Tulare, Redding, Igo, Lemoore, Lincoln, Williams, Red Bluff, Fresno, Downey, San Bernardino, Benicia, Newcastle, Bodie, San Francisco, and other places, they have been quite noticeable from their frequency, but not from their fatality, as the type has been mild and yielded readily to appropriate remedies.

Scarlet fever was quite prevalent in Sacramento, San Francisco, and several other localities. The type is particularly mild. This form of the disease implies gross carelessness upon the part of parents and guardians in permitting their children to attend school, and in allowing the visits of other children to their homes while the disease is still there. Every case of scarlet fever or scarlatina should be promptly isolated, and no intercourse permitted between the sick and the well until perfect convalescence was established, and the place of sickness thoroughly fumigated and disinfected. Scarlet-fever germs are among all germs most persistent in their tenacity of life; they will live for months, perhaps years, in infected garments, and come forth at some favorable opportunity to reap a harvest of sickness, perhaps death, or, in many instances, to impress a lifelong impairment of bodily strength and vigor. The mildness of the attack is often the precursor of serious disease, and too much care cannot be taken of those affected by scarlet fever in any form, and no words can sufficiently condemn any person who permits the intermingling of the sick, suffering from scarlet fever, with the well, where it is within the bounds of possibility to prevent it.

Smallpox appeared once in the month in Sacramento. As we know not how soon the disease may take on an epidemic character and extensive range, the necessity of immediate vaccination cannot be too earnestly urged. An epidemic wave of this character is slowly but surely passing over these United States, and we cannot escape it except by thorough vaccination and re-vaccination, when it will pass harmlessly by.

Diphtheria when attacking children in the form of croup is more generally fatal. The necessity of taking all possible sanitary measures to prevent the spread of this formidable disease is apparent, or ought to be, to everybody, and yet we see houses crowded with mourning friends where the spores of disease are floating all around them, and if they escape it is not owing to their own prudence, but to the favorable condition of their system. Until such foolish proceedings are forbidden by law, and under a penalty, we may expect diphtheria to be carried from place to place and to take its victims wherever it can find a suitable medium for its development.

The board is now engaged upon the work of ascertaining how far the prevailing diseases among cattle are dangerous to human life, and to what extent they prevail or are likely to affect the food supply of the State.

GROWING TALL BY EXERCISE.—Exercise is generally taken without any direct reference to the increase of height. Thus it often happens that the gymnastic feats chiefly indulged in tend rather to check than to increase the rate of growth. This applies particularly, says Mr.

R. A. Proctor, to the lifting of heavy weights, the use of large dumb-bells, involving comparatively slow movements, and all exercises which tend to increase the supporting power of the spine and leg-bones, even though they be exercises primarily directed to increase the muscular power of the arms. Pulling exercises, though they tend to increase the development of the arms in length as well as in girth, round the forearm chiefly, do not on the whole favor the development of length of limb. Sailors, who from boyhood upward are much employed in pulling and hauling, are on the average short men, though often the development of strength and weight resulting from their active open-air lives is remarkable. We see oftener among them than in other classes brawny chests, shoulders, and upper arms in company with lower limbs which by comparison appear almost stunted. On the other hand, men engaged in hunting or in occupations requiring much walking, running, leaping and the like, acquire well-developed lower limbs, and are on the average taller than other classes.

The Oil Glands.

We clip the following very instructive article from a late number of the *Youth's Companion*: Nearly two and a half millions of sweat glands pour out upon the surface of the body a watery fluid, which aids in keeping the skin soft, and, by its evaporation, in regulating the bodily temperature. Besides these sweat glands, the skin contains the so-called sebaceous glands, that exude an opaque and oily matter. The ducts convey it either directly to the surface or into the upper portion of the hair follicles—the cavities from which the hair proceeds.

The oil is designed to help keep the skin supple, and especially to promote the softness of the hair. These glands are absent from the under part of the feet and hands, and are most abundant in the scalp, face, canal of the ear, and about the nose and mouth. Those in the ear secrete the ear-wax. An excess in the secretion renders the face shiny; a deficiency renders the skin and hair dry and harsh.

The glands are sometimes obstructed when the oil becomes thick, or when there is a neglect of cleanliness. This gives rise to *papule*, or pimples, which, on being pressed out through the narrow mouth of the oil duct, resemble worms or grubs. They are frequently celled *worms*, naturally enough, since the hardened dirt on the outer end looks like a bead; but they are only thickened oil, though occasionally a minute living worm chooses one of them for his abode.

Occasionally the more fluid elements of the oil are absorbed, leaving only the solid, and these harden into cutaneous calculi. Or the obstructed secretions—yellow, half liquid and half solid, like putty or mortar—may form small tumors on the eyebrows, face, neck and head. They should be cut out when small, or destroyed with caustic. Still, their only harm is in the deformity they cause.

The various forms of acne, or pimple, are due to inflammations of these glands. They occur mainly at the period of puberty and in the years immediately following, and are regarded as due to the constitutional changes then in process. There is at that period a languid and torpid condition of the skin, a tendency to the accumulation of sebaceous matter, and a congestion of the coats of the follicles.

The treatment consists in removing any exciting cause that may exist, improving the nutritive power of the skin and the general system, and stimulating the parts affected. There should also be close attention to diet and habits of life.

USEFUL INFORMATION.

FISHING ON DRY LAND.—A late number of the New Orleans *Picayune* says: Standing on the rim of the bayou at New Iberie, I have often watched the floating islands of turf slowly sailing past me. Sometimes one will be so large that I should like to capture it, anchor it somewhere, and set upon it as a Robinson Crusoe. It will be beautiful with its feather grasses arising like an Indian princess' plumes—its silver-green rushes, and in the sun, its white lily-cups or flags of iris floating like a royal standard. Sometimes these floating islands go down the bayou in fleets, thus, after a storm, but whenever seen they are honey voyagers, and are fit to make one go back to the old sweet belief of fairy folk. In truth, they are fragments wind-torn from the "trembling prairie." In winter-time the hunters go out to this prairie, and with a spade dig a hole in it. They dig a foot or two, and then come to water; a fishing line is dropped in this novel well, and they may catch fish all day long.

INDIA INK—HOW MADE.—India-ink is, in fact, Chinese ink, as it originated in China, and is manufactured there. When first made it was composed of lac, a resinous substance deposited by a small insect. Later, a peculiar black stone was found which could be dissolved in water, and still later lac and firwood were burned, and the resulting smoke was gathered on some hard substance and rolled into hells. The same principle is now employed, but the smoke is a little more scientifically handled. In the middle of a big porcelain dish, about two feet in diameter and three or four inches deep, they place a stand of about six inches in diameter, and the same height as the dish. Several

small lamps rest upon the stand, and by means of arms fastened to the sides of the dish, small conical dishes are held just over the lamps. The dish is filled with water almost up to the tops of the lamps' wicks and the lamps are lighted. The smoke condenses on the conical dishes hung over the lamps and is collected in the form of a dense black powder. This powder is placed in a vase and a warmed mixture of nine parts of fish glue and one of animal glue strained into it through a piece of silk held over the month of the vase. The contents of the vase, then being thoroughly stirred, are rolled into balls, wrapped in cloth and immersed in hot water. Kneading, another immersion, and beating with a hammer, follow; the paste is scented, and in the form of long sticks is placed in various shaped molds. Wrapped in paper, the sticks are placed in a dish filled with rice-straw ashes, and in a day or two are thoroughly dried. Rubbing with cloths and brushes serves to clean and polish them, and they are then ready for the market.

ANCIENT CITIES.—Nineveh was 15 miles long, 8 wide, and 40 miles round, with a wall 100 feet high, and thick enough for three chariots abreast. Babylon was 50 miles within the walls, which were 87 feet thick and 350 high, with 100 brazen gates. The Temple of Diana at Ephesus was 420 feet to the support of the roof. It was 100 years in building. The largest of the pyramids is 461 feet high, and 653 on the sides; its base covers 11 acres. The stones are about 30 feet in length, and the layers are 380. It employed 330,000 men in building. The labyrinth in Egypt contains 300 chambers and 250 halls. Thebes, in Egypt, presents ruins 27 miles round. Athens was 25 miles round, and contained 350,000 citizens and 400,000 slaves. The Temple of Delphos was so rich in donations that it was plundered of \$500,000, and Nero carried away 200 statues. The walls of Rome were 13 miles round.—*Our World and Its Wonders*.

SUGAR AS A FIRE KINDLER.—The servant girl who pours kerosene oil on the fire to make it burn up quick seems to be disappearing; but in her place another has made her appearance, with a very different material, to accomplish the same object. It was in Boston, and not long ago, that the mistress of a house, not much given to going into the kitchen, entered one day unexpectedly just in time to catch her kitchen maid in the act of emptying a spoonful of granulated white sugar into the fire. Sugar is exceedingly inflammable, and its application made the fire flash up in excellent shape. The head of the house had noticed that he was called upon to pay for a great many barrels of sugar, and his wife had wondered at the family's enormous consumption of that article, but she did not wonder any more, especially as the girl confessed that she had regularly been using the sugar for a long time.

A "TEST FOR SEWER GAS" has been going the rounds of the papers which deserves notice on account of its misleading character. It consists in exposing to the suspected atmosphere pieces of paper moistened with a solution of sugar of lead, which are supposed to indicate the presence of the dreaded gas by turning black. This test is entirely unreliable, and only indicates the presence of sulphuretted hydrogen, a very disagreeable gas, but not especially dangerous in small quantities. There is no definite test for sewer gas known, and it is much better to avoid all possibilities of its presence than to depend upon any chemical tests for indications of its existence.—*Popular Science News*.

A NOVEL METHOD OF LOCATING A LEAK in a water main was employed recently at Rochester, N. Y., with entire success. The break in the main was known to be between the banks of the river. A solution of bi-permanganate of potash was introduced at a hydrant on the side of the river nearest the reservoir, and observers were stationed on the river along the line of the main. A deep reddish-purple discoloration of the river-water at one point soon made the exact location of the leak apparent.

CORN-COBS PRESSED INTO BUILDING BLOCKS. Building blocks made of corn-cobs form the object of an Italian patent which has been recently issued. The cobs are pressed by machinery into forms similar to bricks, and held together by wire. They are made water-tight by soaking with tar. These molds are very hard and strong. Their weight is less than one-third of that of a hollow brick, and they never get damp.

THE BUTTER COLOR used by nearly all farmers and creameries in increasing the yellow tint of their product is annatto boiled in cotton-seed oil, and although the amount of oil in the mixture is exceedingly small, it comes within the letter of the statute defining oleomargarine, according to a decision of the Commissioner of Internal Revenue.

ACROSS GREENLAND.—The venturesome explorer who recently started from the east coast of Greenland to cross that arctic continent has arrived safely at its eastern shore. Scientists will await with eager interest his report upon this interesting journey—the first ever made across the land of ice and snow.

ONE elephant discovered among the tertiary rocks could not have been less than 16 feet in height.

ENGINEERING NOTES.

Wind-Power for Electric Lighting.

Prof. Blyth recently read before the Glasgow Philosophical Society a paper on the above subject wherein he describes an experiment which he made last summer—the lighting of a cottage in which he spent his vacation by a dynamo driven by a windmill, and charging a storage battery. The windmill used was an old-fashioned style, with four arms at right angles to each other, each of them 13 feet long. There was no especial regulating device. The dynamo was belted directly to the fly-wheel of the mill, and charged 12 cells of storage battery, which supplied the incandescent lamps in the cottage. Prof. Blyth had never used more than ten lamps at once, but he could have used more. With a good breeze, enough electricity could be stored in half a day to supply light for four evenings of three or four hours each.

The lamps used were of eight-candle power. When charging, the current passed through a cut-out that would disconnect them from the dynamo when it ran below a certain speed; so the windmill could be allowed to run all the time, charging the battery when the wind happened to be strong enough. The current had also been used to run a light turning lathe, and Prof. Blyth had begun to make a light carriage to be run by the stored electricity.

The paper opens up a field for ingenuity, comfort and amusement in our homes. By such simple means we could light our houses economically; our light would be better, cooler and healthier than gas or coal-oil lamps; while the current could be utilized for running fans, sewing-machines, etc. Indeed, to the average American, with a little spare time and some small ingenuity, the amusement and instruction of such a plant would more than pay for its expense.

Propulsion of Ships by Air Propellers.

At the last meeting of the British Association for the Advancement of Science, a paper was read by Mr. H. C. Vogt, suggesting the propulsion of ships by means of revolving sails acting in the air. The advantages to be gained over the ordinary form of screw propulsion were summed up as follows:

(1) A saving in engine-power by eliminating the disturbing action of the screw; (2) the form of the ship could be determined with reference to least resistance and seaworthiness only, and the division in water-tight compartments could be complete; (3) the change in trim will be less disadvantageous when the power is applied above the deck than below the center of gravity; (4) the vibrations caused by the screw propeller, which are destructive to the ship and most unpleasant to those on board, will be avoided; (5) the proposed air propeller will utilize the natural wind-power.

The air propeller, as explained by Mr. Vogt, is, in its outer shape, somewhat similar to the ordinary water screw, with sails or blades made of thin sheet steel, having the greatest width near the circumference. The pitch of the blades is capable of being varied in order to utilize the power of the wind, because nearly 80 per cent of the winds, the whole compass round, augment the thrust of the propellers.

A CANAL ACROSS ITALY.—It is proposed to commence a canal upon the northwestern shore of Italy, just above Civita Vecchia, at Castro, and to cut through to Fano on the eastern or Adriatic shore. A glance at the map of Italy will show that in this line two lakes are met, those of Bolsena and Trasimeno, and it is proposed to drain these two lakes, thus securing the area for cultivation. The length of the canal will be about 169 miles, the width of it 110 yards, and its depth is to be about 39 feet, so that ships of any tonnage, and even men-of-war, will be able to pass through it. The cost of the canal is reckoned at \$100,000,000. It is estimated that the work could be completed in five years from its commencement. The Italian journals are highly interested in the project and are taking up the matter warmly, and when the fact of the long sea passage around the south coast of Italy and up the stormy Adriatic to Trieste and Venice is remembered, certainly the canal would be of immense service to the whole of Southern Europe.

A NEW DEVICE FOR UTILIZING A CURRENT OF WATER.—A Russian engineer, M. Tsyn, has invented a new means of utilizing a current of water. The apparatus consists of an endless cable, carrying a series of canvas cones which open and shut like an umbrella. The endless cable passes over a double drum on board a pontoon, and at the other end over a pulley suspended from a buoy. The current opening the cones on the rope moves the cable at a certain speed, and this drives a shaft or drum. On the upper part of the rope the cones are naturally closed by the current to which they present their points. This plan, it is suggested, would serve to raise a certain quantity of water for the purpose of irrigation.

CARBOLIC ACID IN DIPHTHERIA.—M. Roulin has successfully treated 22 cases of diphtheria with carbolic acid as an antiseptic. Nasal douches, consisting of three teaspoonfuls of the crude acid in a quart of water, were employed every hour by means of the ordinary irrigator. Tonics were given internally.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NORTH STAR.—*Ledger*, Nov. 17: We are pleased to announce an important improvement in the prospects of this mine, situated between Sutter Creek and Amador City. It has been in process of development by Sutter Creek men for the past 18 months. After sinking a shaft 600 feet, drifting was commenced. The north drift was run a considerable distance without revealing anything of importance, and work was stopped in this direction. A drift was then started south following the hanging-wall. On Sunday last, after reaching a distance of 85 feet from the shaft, a small vein of quartz was encountered. It required no assay to convince the practical miner that the ore was of a good-paying character. It was of a dark-ribbed nature, plentifully charged with sulphurets. No free gold was visible in the first few parcels of ore extracted, but excellent results were obtained by pounding the rock in a mortar and panning it out. The vein was very small at first—only an inch or two thick—but it widened out as it followed, and by Monday morning it was at least 12 inches thick, and fine flowery gold was visible in many pieces to the naked eye. An assay was made by E. C. Voorheis, which yielded at the rate of \$238 per ton. The strike is considered of vital importance. It is taken as the edge of a chimney of pay ore, and at the depth of 600 feet the discovery of a fair-sized chimney would amount to the practical demonstration of the existence of a permanent mine. It has greatly elated the hopes of the people of Sutter Creek. The ore is much the same in appearance as that of its close neighbor, the South Spring Hill, and indeed, the manner of its discovery was also very similar.

MISCELLANEOUS.—The ten-stamp mill which S. D. R. Stuart has erected on his recently-purchased quartz claim, about six miles east of Sutter Creek, is completed. The ore-chute to the mill has been found defective. The grade is not sufficient to enable the rock to roll down with ease, and it is probable that it will have to be taken out and a tramway put in its place. There is about 50 tons of rock on the dump ready for crushing. The Amador gold mine paid off on the 12th instant, that being its regular pay-day for more than two years. The company commenced with a monthly expense of about \$1500, and have been increasing until now its monthly pay-roll, including contracts on the mill, runs over \$15,000. The foreman has about 40 men on the mine, running drifts, crosscutting, sinking and raising, as well as opening stopes, putting in chutes, so that he can supply the 60-stamp mill, which J. B. White, the contractor, says will be finished and ready to run some time during the month of February.

DRYTOWN.—*Amador Ledger*, Nov. 17: The Governor mill is shut down on account of scarcity of water; some of the miners are also idle. They have commenced drifting at the Cosmopolitan, and some of the hands are laid off in consequence. Marcus Jorgerson is making some improvements on his claim on the creek about a mile above town.

SUTTER CREEK.—The town is all excitement over the rich strike in the North Star. The farther the drift is extended the richer grows the rock. Specimens were taken out to-day which were literally studded with coarse gold. Since last writing the Wildman mine has improved wonderfully at the 600-foot level. There is said to be a 10-foot ledge of good average pay rock. The opinion is gaining ground that they will have one of the best paying mines in the county in a year or so. The mill was stopped last night for want of water. Other mills will soon have to suspend for the same reason unless the water supply increases.

Butte.

A PROMISING CAMP.—*Nevada City Herald*, Nov. 17: A letter from J. H. Higgins, recently of Grass Valley, but who is now employed at the Golden Queo quartz mine at Forbestown, says that camp is very lively and promises to become quite a town. The Golden Queo is putting up a 10-stamp mill. The Stow mine is showing well. Forbestown was a decayed gravel-mining camp till a short time ago, when Hon. W. W. Stow started operations on an undeveloped ledge. Since then prospecting has been lively and indications are good for very rich mines being opened.

Calaveras.

MILL MOVED.—*Calaveras Chronicle*, Nov. 17: The mill at the Comet mine, near San Andreas, is being taken down and will be put up on the Quartz Glen claim near Rich gulch. The mill is a 20-stamp one, but it is the intention of the company operating the Quartz Glen to add 20 stamps more.

RICH ROCK.—We were shown some exceedingly rich rock one day this week, which was taken from the mine owned by Vandel & Zumwalt, on Esperanza creek about six miles from this place. The specimens showed us assayed at the rate of \$100 per ton.

El Dorado.

GRAVEL.—*Placerville Observer*, Nov. 17: The owners of the Chili Ravine mine—L. Landecker, Frank Goyan and Jack Gluas—are in high feather over the discovery of a very rich body of gravel in that mine. The tunnel is in over 1100 feet and they expect soon to reach an immense channel which is known to exist and to be very rich. This bench is looking fine, and, as Jack Gluas says, "is prettiest body dirt hever struck pick hint." We saw a panful washed which yielded nearly 51. The formation of this bench, with every indication that it will hold in depth—if not improve—gives great encouragement as to future results. The Chili has a long life before it.

Inyo.

STRIKE.—*Inyo Independent*, Nov. 17: George Turner is reported to have made a big strike of silver and lead ore in a mine over near Deep Spring lake. He will soon make a shipment of the ore.

MARBLE.—Mr. Israel Luce arrived at the marble quarry last Wednesday from San Francisco. He was accompanied by several expert marble-workers. Mr. Luce will now go on quarrying marble for market.

Monterey.

LOS BURROS.—*Monterey Democrat*, Nov. 17:

About a month ago Wm. Pinkertoo purchased a twelfth interest in the Cruikshank mine, paying therefor \$5000. This week Rev. Mr. Holmes of Pacific Grove offered him \$10,000 for the interest, but we doubt if it could be bought for \$50,000. Mr. Holmes has purchased one-half of Sheriff Graves' interest in Los Burros, and expects to make a trip to the mines first of next week.

Nevada.

THE MANZANITA MINE.—*Transcript*, Nov. 17: By the recent heavy cave of the hydraulic bank at the Manzanita drift claim, which broke down the drifting tunnel for a long distance and buried five tons of steel track rails, about 75 men working in one capacity and another were thrown out of employment. Before the mishap the owners were "on velvet," as one of them expressed it yesterday. They were realizing big profits, and expected to soon double the number of miners so as to have about 80 in all on the three shifts. By this increase of force they thought they would get the old portion of the claim entirely worked out by spring. As it is, they cannot again get into the channel there at an outlay which the probable returns would justify. All labor will be suspended this winter, and when the stormy season is over the work of driving an entirely new tunnel into the easterly part of the claim, where there is a large tract of virgin ground, will begin. The tunnel will have to be started from an incline shaft, necessitating the use of hoisting and pumping machinery.

THE EL DORADO.—The Nevada City Co., engaged in prospecting the El Dorado claim of Delhi district has substantial reason to regard the future of the property with confidence. The ledge struck in the tunnel about 230 feet from the mouth, and which was but four inches thick at that point, is being traced. At last accounts it had widened out to 18 inches and was of good quality.

THE CHAMPION.—The ledge being worked on the 400-foot level of the Champion shows the largest and best body of ore ever seen in the mine. In some places it reaches a width of 17 feet. The ore is of superior grade. The owners have every reason to feel satisfied with the property which they have expended so much money and energy in developing.

THE COLE AND WHITE MINE.—*Herald*, Nov. 16: The above mine is located on Gaston ridge, Washington township, nearly west of the mouth of Canyon creek. It is in a slate formation and the ledge is about eight feet in width. Four feet of the ledge next to the hanging-wall has rock which it is estimated will pay at least \$40 per ton. The owners, from whom the mine took its name, sunk a shaft about 45 feet deep, the rich rock continuing down to that depth. Some time since, Fred Bradley, superintendent of the Spanish mine, took hold of the property and has been engaged in sinking ever since. It is said the rock is improving with depth, and it is confidently believed there is a good mine there.

NEW EUREKA.—*Tidings*, Nov. 17: The hoisting gear of the New Eureka plant does not work well, and improvements, necessitating castings, are to be made. M. C. Taylor will do the work and expects to have it completed in less than a fortnight. In the meantime operations at the mine will be suspended aside from running the pump. Prospectors on Deer creek have struck a two and one-half foot ledge at a depth of 55 feet, which yields some pretty ore. Much lead is shown, and sulphurets, but the latter are of a character which carry very little gold. The vein is in slate formation. Four tons of the ore, reduced by mill process, yielded an average of \$8.60 to the ton.

THE BRUNSWICK AGAIN ATTACHED.—*Transcript*, Nov. 18: Eastern parties have levied an attachment on the Brunswick quartz claim at Grass Valley for a little over \$14,700, and Sheriff Lord has put in Capt. Fitzgerald as keeper. The debt is for money advanced the company to pay for purchase and development work and to raise the attachments recently put upon the property by Messrs. Tilley, Fletcher and Silvester. It is believed that this proceeding will swamp the Brunswick Co., which was never very vigorous financially.

MILLS.—*Nevada City Herald*, Nov. 20: A walk down Deer creek canyon yesterday would have made any resident of this city feel glad. The air was full of music made by quartz-mills. Twenty stamps were running at the Providence, ten at the Champion, two at the Merrifield and ten at the Mountaineer, each and all the mills being in hearing distance of each other.

THE CHAMPION.—The Champion mine is a comparatively new venture. Although the ledge was located and work commenced in 1876, it was only a year ago that the present works were started. The company had previously run a tunnel 3000 feet in length, erected hoisting-works on the north end of the claim and made extensive developments. But it was found that the ledge formed a junction with the Wyoming, and, after protracted litigation, that part of the ground was left idle after an expenditure of \$75,000. Not at all disheartened, the company went back to the creek and commenced operations there. They started in on August 15, 1887. Since that date they have sunk a ten-foot-wide shaft to a depth of 400 feet, erected hoisting-works and a 15-stamp mill, which only has ten stamps in place, however, at present, and done considerable drifting in the different levels. The machinery is all run by water-power and the works are all in first-class shape. There are at present only 28 men employed.

THE PROVIDENCE is keeping 20 stamps running by day on rock from the 1250-foot level. Twenty of the stamps are yet idle, but they will be pounding away after a little. There are 40 stamps, 16 Frue concentrators, a large chlorination-works, and all the appliances necessary to work ores closely. A full force of men will be at work there when everything is ready.

IMPORTANT DEVELOPMENTS PREDICTED.—*Tidings*, Nov. 16: A six-inch plunger pump is being placed in position in the new Eureka shaft. This work completed, sinking will be vigorously prosecuted until the ledge struck in a crosscut is cut by the shaft, where stopping will be commenced. Supt. Weldon predicts important developments in a few months.

THE SUNLIGHT MINE.—*Transcript*, Nov. 16: L. Duterte, the San Francisco mining capitalist, who arrived here Tuesday evening, went yesterday to Washington township to put some men at work on the Sunlight quartz claim, which is situated near the

Eagle Bird at Mayhert. The intention of Mr. Duterte and the other owners is to put up hoisting works and a mill in the spring.

THE NEVADA CITY MINE.—The Eastern Co., which recently leased the Nevada City quartz mine has forwarded to B. N. Shoecraft funds with which to resume work on the mine in case satisfactory terms can be made with the creditors.

Placer.

GRAY EAGLE.—*Placer Herald*, Nov. 17: The Gray Eagle Co. has put up a Cornish pump in the shaft. The new boiler is on the grounds, and the new hoisting works are going up. The old machinery is being replaced by new.

MOUNTAIN GATE.—The owners of the Mountain Gate mine at Damascus, according to the latest report, are running through a reef of rock and expect to strike the channel on the other side.

Shasta.

FROM LOWER SPRINGS.—*Cor. Courier*, Nov. 17: There is but little done in the way of developments of the mines, although considerable gossip is going the rounds, but not applied in the right direction. It is the common prediction now that there will soon be considerable activity in opening up mines and milling ores from the croppings. A good custom-mill in Lower Springs district, with crushers and concentrators adapted for working low and high ores, would be a profitable business for some speculators, and a Godsend to our poor miners, and a double Godsend to Old Shasta town. Shasta is the nearest town to the most of our best mines, and the healthiest town in Shasta county; and it would be reasonably well for every man in this district to take hold and join hands for the determination of showing up some of our fine prospects. We ought to be ashamed to ask capital to come up here and look at the insignificant little holes in the ground with but one place upon the entire ledge that can show milling ore. Show up your mines as well as possible, like the Mountain View mine, Eureka, Daniels, White Oak, Mrs. Wiser's Spanish Ledge, and Illinois Mining Co., who are shipping some very fine ore now to Selby Co. for reduction. All of the above mines have produced splendid ore, and have more in sight. There are plenty of ledges here in this district that would produce shipping ore if properly sorted, and if there were deep shafts sunk upon our productive ledges, there would certainly be deposits of very rich ore.

DEADWOOD.—*Redding Free Press*, Nov. 17: George Klein was in town Thursday, looking as jolly and prosperous as ever. He struck several veins of gold-bearing quartz in his new discovery, which he has named the North Pole mine, and the rock now coming out averages \$46 to the ton. The McDonald Bros. have purchased the Red Diamond mine of B. Lamb, and are sinking on a vein three feet thick, which shows considerable free gold, and is very heavily charged with sulphurets. Joe Falin is crushing some very rich rock taken out of the Vermont mine, which will not work less than \$70 per ton. He has had some heavy rustling in the old mine, but it will reward him in the near future.

TIN.—Some excitement has been caused around Sisson's by a discovery of tin about six miles from that place, north of Black Butte.

Sierra.

BUFFALO MINE.—*Tribune*, Nov. 16: Last Wednesday J. J. Lee, one of the original locators and a principal owner, accompanied by Bert Schlesinger, went up to the Buffalo mine. The boarding-house is completed. The track leading from the tunnel to the mill will be 600 feet in length. The shed over it will be built in V-shape and the roof covered with sheet iron. This work is well under headway and will be completed in a few days. The framework of the mill is up and the machinery is all on the ground. Twenty-five men are employed.

Siskiyou.

RIVER CLAIMS.—*Yreka Journal*, Nov. 17: River miners in the Honolulu and Oak Bar districts still continue to take out pay gravel from the channel, and may possibly be able to work a month longer, if we do not have heavy storms or severe frost before. The heavy rainstorms raise the river to endanger the dams, and if continuing for some time, will cause the miners to pull out their apparatus to prevent danger of being washed away. Heavy frost also stops work, on account of loosening the banks, to render them unsafe for working under. Considerable mining will be carried on at the dry diggings in the high mountain gulches this winter, if sufficient rain or snow is gulched to furnish water for sluicing.

Tuolumne.

RIVER MINE.—*Tuolumne Independent*, Nov. 17: J. R. Moffitt's river mine closed down on Saturday last. They had struck into a part of the mine that had been worked in former days, and the lateness of the season would not justify moving the machinery to new ground. Hence it was deemed best to suspend operations until next summer. It is a very expensive claim to work.

BONANZA.—*Union-Democrat*, Nov. 17: The Bonanza mine, under the control of the present lessees, promises to yield all that can be expected under the best management. The lessees have expended probably \$2500 in purchase of the best machinery and in the most thorough timbering of the works. They have spared no expense to make the work permanent as they have progressed. Before reaching the ground from which they hoped for remuneration, they have picked up 136 ounces of gold—enough to reimburse them for their outlay. The Bonanza is in the hands of men who will develop the mine for permanent results, regardless of the expense of making the works substantial as they proceed.

NEVADA.

Washoe District.

BALTIMORE.—*Virginia Enterprise*, Nov. 17: Crosscutting at several points in the ore found on the 300 level, and upraising from the 300 level to the 200, and saving the ore for reduction.

SAVAGE.—On the 400 level the southeast drift has been advanced 15 feet and continues to porphyry and clay. From the north and south drifts on this level we are stopping ore from the east crosscut near our south boundary. From the 600 to the 750 levels are extracting ore from the old stopes. On the 950 level the east crosscut is being advanced through the old stopes, exposing ore of low grade. Have men

employed on the several levels running prospecting drifts, easing timbers and making repairs in the vertical shaft. Have hoisted during the week 625 tons of ore, and have shipped to the Rock Point mill 570½ tons of ore. Average battery assays, \$21.79 per ton. Have shipped during the week bullion amounting to \$9293.41, and have \$906 in bullion on hand.

CROWN POINT.—West crosscut No. 2 on the 700 level is in 84 feet, of which 50 feet is in vein matter. Passed through 18 feet of quartz, assaying as per report of October 30th—\$16 to \$24 per ton—and 33 feet of porphyry and quartz mixed, yielding low assays. The face is still in porphyry and quartz, with considerable water coming from it. Have started a south drift from the 800 station, which is out 15 feet. Good progress is being made in cutting out the drain in the Sutor drift. Have shipped to the Santiago mill for reduction 262 tons of ore saved in running the 700 drifts. The bullion returns have not yet been received.

BEST AND BELCHER.—300 level: In west crosscut No. 1 at a distance of 120 feet from main north-west drift, winze station has been completed and a new winze was sunk to a depth of 5 feet, passing through ore of fair quality. South drift from bottom of old winze has been extended a distance of 8 feet; total length, 20 feet. Formation, quartz and porphyry, showing some value. 625 level—Main north drift cleaned out and repaired a distance of 25 feet; total length, 550 feet. West crosscut No. 3 on this level has been cleaned out and repaired a distance of 70 feet.

BELCHER.—The 200 north drift from the shaft advanced 15 feet during the week, making the total 146 feet. No change to report of the ground run through. The 160 south drift from Crown Point to meet it advanced 12 feet. Repairs to the pump compartment are finished to the 700 level, and we are now engaged in putting in the incline rope and hope to continue the joint east drift from the 1100 station in a day or two. Good progress is being made in cutting out the drain in the Sutor drift.

CONFIDENCE.—The raise from the 1200 level is now up 21 feet, having been advanced 5 feet during the week. The face still continues in ore of fair quality. Are shipping daily to the Brunswick mill for reduction 179 tons of ore, the average battery sample of which shows a value of \$27.68 per ton.

HALE AND NORCROSS.—On the 800 level the north drift has been advanced 28 feet; total, 70 feet. The south drift has been advanced 35 feet; total, 125 feet. Have men on repairs to the shaft stations and on the several levels, and are now prepared to resume the extraction of ore.

CHILLAR.—The west drift from the shaft, 850 level, is in 85 feet. The west drift from the shaft, 750 level, is in 104 feet; the face is in clay and quartz. The raise in the north drift on the 650 level is up 22 feet, showing quartz giving low assays. The north drift on the 450 level is in 732 feet.

JUSTICE.—The southeast winze is down 38 feet below the 490 level. The bottom of this winze is in ore assaying from \$20 to \$30 per ton. The west drift on the 490 level is in 130 feet from south drift. The face is in hard porphyry.

ALPHA.—The 500 level north lateral drift is north of the shaft 167 feet; the face is in clay and quartz. The south lateral drift on the same level is in south of the shaft 72 feet; the face is in quartz that assays from \$12 to \$20 a ton.

CHALLENGE.—Prospecting in various parts of the mine, and 25 tons of ore daily are being extracted and sent to the Brunswick mill for reduction, the average battery sample of which shows a value of \$27.68 per ton.

ENCHEQUER.—On the 382 level the north lateral drift is in north of the Alpha shaft 495 feet; the face is in clay and porphyry. The east crosscut on the same level is in 231 feet; the face is in porphyry.

GOULD AND CURRY.—200 level: West crosscut from top of upraise from El Dorado (300 level) has been extended 22 feet; total length, 136 feet. Formation, clay and porphyry.

SEG. BELCHER.—Are now engaged in putting the rope in the incline and hope to continue the joint Belcher-Seg. Belcher east drift from the 1100 station in a few days.

YELLOW JACKET.—The hoisting works are working finely, and are shipping ore steadily to the Brunswick mill.

ALTA.—Still stripping the vein on the 900 level by north and south drifts. The mill is running steadily.

ANDES.—Running the north lateral drift on the 350 level, and sinking the winze on the 240 level.

CON. IMPERIAL.—Repairs to the main north lateral drift are still being carried on.

POTOSI.—The south drift, 650 level, is in 585 feet; the face is in clay and porphyry.

BULLION.—There is no change to report in the drifts on the 500 and 640 levels.

SCORPION.—There is no change to report in the work on the 300 level.

Belmont District.

RUNNING.—Belmont *Courier*, Nov. 17: The Monitor-Belmont mill is running satisfactorily. Lessee J. E. Severance shipped on Thursday last 2373 ounces of silver bullion (in two bars), nearly 900 fine. This was the result of three days' run with the aid of only three pans. The mill is still producing good bullion, and Mr. Severance will make regular bullion shipments from this on.

Eureka District.

THE DIAMOND.—*Eureka Sentinel*, Nov. 17: The mine of this name owned by Dan Foley, Denis O'Leary and Morris Brothers is improving right along. We paid the property a visit on Wednesday last. There is perhaps double as much ore in sight now as there was a few months back. Two principal crosscuts have been extended into the ore body 25 and 30 feet respectively. The ore is of good quality at all points. The size of the bonanza has not yet been determined in any direction. At this moment it seems to be the best hope of Eureka district. It makes a better showing than did any of the great Ruby Hill mines, with an equal amount of work and exploration. The geological conditions are also right for a big mine. There is a reasonable chance for the Diamond to be as great a mine as has ever been discovered in Eastern Nevada, but it will take some time to ascertain its full value. The

property is still in the hands of the original owners, who are prosecuting developments in a sale and conservative manner with a small force. Only such ore as is being taken out of the necessary drifts is shipped to defray expenses. There has been no stopping thus far. All of the ore is of good quality, though there are some streaks that are richer than others.

ORE SHIPMENTS.—During the past week ore shipments were made from the following-named mines of the district to the furnaces: From the Hamburg mine, 231 tons; Dunderberg, 160 tons; Jackson, 46; Lord Bryon, 22; Alexandria, 2; Diamond, 16; Geddes & Bertrand, 9; Williamsburg, 5; Pinto, 9; White Pine 6 tons, and Benson 75 pounds. From the Rio Members mine, 36 tons; Ethel, 3 tons; and the Margueretta, 19 tons.

BULLION AND LEAD.—The Eureka Con. M. Co. shipped yesterday eight bars of silver bullion valued at \$10,400, and during the week they shipped 80 tons market lead. The Richmond Co. shipped during the week, 40 tons of silver-lead bullion.

Tucuman District.

GRAND PRIZE.—*Times-Review*, Nov. 16: The water has been lowered a distance of three feet during the past week.

COMMONWEALTH.—100-foot level: North drift from joint crosscut has been advanced 13 feet through clay showing small seams of ore. No. 1 winze from east lateral has been sunk seven feet. Intermediate drift from top of No. 4 chute has been extended 7 feet, showing some good ore. 150-foot level: No. 1 north drift from No. 1 west crosscut has been extended 29 feet, exposing some seams of quartz. Upraise from No. 3 north drift has been extended upward 16 feet, a little water coming in from top of raise. 225-foot level: No. 1 east crosscut at the line has been advanced 9 feet. No. 1 west crosscut at same point has been advanced 10 feet. 300-foot level: Good progress is being made in cutting out the station, which will be finished during the coming week.

NAVAJO.—The crosscut from west vein, 350-foot level, extended 12 feet. South drift from No. 4 crosscut, same level, extended 13 feet. Crosscut from west vein, 150-foot level, extended five feet. The stopes above the 350-foot level are looking well, and are yielding very high-grade ore. On the same vein, 250-foot level, the front stope is being opened and stilled preparatory to stopping; the vein at the point shows considerable native silver. The stopes in other places are looking well. The mill started on Sunday and is running well; the battery has averaged \$308.28.

NEVADA QUEEN.—The mill has been cleaned up and bullion shipped; assay value, \$30,739.43. Ninety tons of concentrating ore have been hoisted, taken from the stopes where the timbering is being done. Work on the new mill is progressing favorably.

FOUND TREASURE.—The timbers in southeast drift, 150-foot level, have been renewed nearly halfway to crosscut from the old shaft. Some ore has been shipped to the reduction works.

NORTH BELLE ISLE.—Intermediate drift from No. 1 winze, 300 level, extended five feet in ore. West crosscut No. 2, 400-foot level, extended 12 feet.

BELLE ISLE.—East crosscut from north drift, 250-foot level, extended seven feet; rock in the face harder.

ARIZONA.

TOMBSTONE DISTRICT.—*Epitaph*, Nov. 17: The Emerald continues to look well and yields about 30 tons of good grade ore per day. The south drift on the 300 level is in about 875 feet, with considerable fair grade ore in the breast. The drift on the 400 level, running in the same direction, is in 917 feet, with about a foot of good ore in the face. The south drift on the 500 is in 1167 feet and appears somewhat broken up, apparently a slip or break in the ledge, and a crosscut has been started west to discover the fault. On the 700 the south drift is in 350 feet and looking very well. The engine for the air compressor to run the Rand drill is in place, and the pipes will all be in within the next week.

LUCKY CUSS.—The fine hoisting works formerly at the Girard have been moved to this mine, and will soon be in operation. The shaft is down 430 feet and will not be sunk much further for the present. The station now being cut out at the 200 will be finished within the next week. Most of the ore now being extracted is taken from the winze between the 300 and 400 levels, and is of good grade. At the Maine and Jonathan about 20 men are employed. In the former mine most of the work is being done above the 700, principally on the 300, with fair results. At the Jonathan the larger portion of the ore comes from the 50-foot level and the surface. The Sulphurets yields about two leads, with back actions of good ore each week. No work is being done in the west side of the Tribute. The Sea Surge is at present looking very well, and the prospects are that proper development will open up a large, good-paying property. The Hirschel continues to improve as depth is reached. Mr. Cook is shipping none but high-grade ore, of which he has quite a quantity on hand and more in the face of the drift. Capt. C. S. Batterman, superintendent of the San Ricardo mines, reports everything in good shape; the concentrating mill running regular and the mine looking well. Major Read reports the mines in the Noon district as looking better than ever. Mr. Louis Gerlock, foreman for Col. Morgan's steam arastras, arrived last Monday from Magdalena. He says that the six arastras are in good working order, and that they are a perfect success.

WATERSVILLE.—The main shaft on the Bunker Hill is down to the 5th level, at which point a station is being opened and timbered. No further sinking will be done until the new machinery is in place. Development work throughout the mine is being pushed as rapidly as the light machinery now in use will permit. The new pipe line from the Huachuca pipe, near the Emerald, will all be laid during the present week. Sufficient ore is being extracted and shipped to pay current and construction expenses.

SILVER KING.—Cor. Florence *Enterprise*, Nov. 17: Several new men have been put on at the mine recently, which would indicate an improvement for the better. Still their number is more than counterbalanced by the number of those leaving.

PACIFIC COAST WEATHER FOR THE WEEK.

[Furnished for publication in this paper by NELSON GORRIS, Sergeant Signal Service Corps, U. S. A.]

DATE.	Portland.			Eureka.			Red Bluff.			Sacramento.			S. Francisco.			Fresno.			Keeler.			Los Angeles.			San Diego.		
	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.	Rain.	Temp.	Wind.
Wednesday.....	00	40	NE	00	54	NE	00	60	CM	00	60	CM	00	58	S	00	64	SE	00	58	N	00	58	W	00	60	W
Thursday.....	00	40	E	00	54	NE	00	60	CM	00	60	CM	00	58	S	00	64	SE	00	58	N	00	58	W	00	60	W
Friday.....	00	42	NE	00	58	NE	00	62	CM	00	62	CM	00	60	S	00	66	SE	00	60	S	00	60	W	00	62	W
Saturday.....	00	42	E	00	58	CM	00	62	CM	00	62	CM	00	60	S	00	66	SE	00	60	S	00	60	W	00	62	W
Sunday.....	00	42	SE	00	58	CM	00	62	CM	00	62	CM	00	60	S	00	66	SE	00	60	S	00	60	W	00	62	W
Monday.....	00	42	E	00	58	CM	00	62	CM	00	62	CM	00	60	S	00	66	SE	00	60	S	00	60	W	00	62	W
Tuesday.....	00	42	E	00	58	CM	00	62	CM	00	62	CM	00	60	S	00	66	SE	00	60	S	00	60	W	00	62	W
Total.....	1.22			0.00			0.00			0.00			0.00			0.00			0.00			0.00			0.00		

EXPLANATION.—C, clear; Cl, cloudy; Fr, fair; Fy, foggy; CM, calm; —, indications too small to measure. Temperature, wind and weather at 12:30 P. M. (Pacific Standard time with amount of rainfall in the preceding 24 hours. T indicates trace of rainfall. Observations taken at 5 P. M. instead of 12 M.

COLORADO.

SEVEN-THIRTY.—Georgetown *Courier*, Nov. 17: An Italian lessee on the Seven-Thirty has an 18-inch vein of 275-ounce ore. The Atlantis of Argentine district is a new shipper of ore mills; \$300 a ton. Howard & Lane are reported to have struck it big in the Beaver lode near the Jo Reynolds. Several small lots were milled from the Pelican last week that returned from \$140 to \$500 per ton. Sixty-four cars of ore were shipped from Georgetown during the month of October, containing 915 tons of ore. Ten tons of \$200-ore from the Mary Foster was milled last week. It was the rock class and looked decidedly rocky. The shipments from Ouray average about 10 cars of ore per week. The value is in the neighborhood of \$125 per ton. The quality of the ore in the lower workings of the Hood is improving. In the breast of the drift is an eight-inch vein of galena and pyrite. New Thomas broke into three-finger widths of ruby and gray copper ore in his lease on the Seven-Thirty a few days ago.

DAKOTA.

RICH TIN STRIKE.—Custer *Chronicle*, Nov. 17: "Julia M." is the euphonic name given to a new tin discovery recently made at Tenderfoot, five miles northwest of this place, by M. J. King, which is said to be the most important strike yet made in that district, which is justly famous for the high order of its tin locations. The Julia M. shows a ledge of four feet of high-grade ore upon the surface for a distance of more than 900 feet, and a shaft sunk 15 feet upon the vein shows at that depth a five-foot vein of ore corresponding in character with the ore found upon the surface. W. W. Challis of that district, who has secured a half-interest in the location, and many others who have examined the property, pronounce it the richest and most important discovery made upon the tin belt this year.

SMELTER.—Deadwood *Pioneer*, Nov. 12: The bins of the Galena smelter are full of ore received from the Queen, Horseshoe, Bullion, Ontario, Hayes and other properties. An experienced miner expresses the belief that the smelter will have a successful career. It is in the hands of practical men, thoroughly acquainted with the resources of the camp, and who had carefully weighed the question before deciding to start the plant up. The mines are capable of furnishing twice the quantity of ore required to keep the plant running, and doubtless it will not be long after this is demonstrated a success before another and larger smelter is started up.

REDUCTION WORKS.—Deadwood *Pioneer*, Nov. 14: The reduction works are just now about the busiest place in the city. Prof. Clark is giving his undivided attention to the progress of the building and placing of machinery as it arrives. A small army of men is employed who are not permitted to be idle either day or night. The building is growing rapidly and will undoubtedly be completed before January 1st. Ore from the Golden Reward is due to begin coming in early next week, and the first run will probably be made on it.

IDAHO.

YREKA DISTRICT.—Wardner *News*, Nov. 17: During the week the teamsters in the employ of the Bunker Hill & Sullivan Co. have been kept busy hauling to the mines the massive new machinery that has recently arrived from the Rison Iron Works, San Francisco. Twenty-two tons have already reached Wardner and an additional amount is now en route. The plant consists of a Duplex air-compressor and Pelton water-wheel, which Superintendent Clement says he expects to have in running order by the last of this month. In connection with the air-compressor the National drill will be used, being its first introduction in Coeur d'Alene. An important addition to the mill will be the erection of a Bulkley injector condenser, one of the best inventions of the age, insuring a large saving of fuel and increase in the power of the engine.

GOLD.—Idaho *World*, Nov. 16: Ben Solomo is at work on a gold-bearing ledge he discovered many years ago. The location is two miles above the head of Plowman's ditch, on the Banner road. The vein is two feet wide and the pay in pockets. The pockets contain good ore. Mr. Solomo thinks he also has good placers near the ledge. D. Ferguson says the crosscut from the 500 level of the Banner mine tapped the vein the other day. The ore is rich where cut, but the drift had not been run any distance on the vein when Dunc left.

PIONEER.—A splendid strike was made the other day in the Pioneer mine. The strike was made in a crosscut run from a raise from the lower level, which, if we remember correctly, is at the depth of 250 feet. The strata are larger and richer than they were in the upper level. The Pioneer is a large ledge, over 90 feet between walls, and is really a porphyry ledge, with innumerable small strata of quartz running through it. The quartz cannot be separated from the porphyry, so the ore, from wall to wall, has been taken out and milled at a handsome profit. After sinking the last level the company prospected a long time for the ledge. The shaft was put down some distance away from the vein.

MONTANA.

AROUND BUTTE AND VICINITY.—Butte *Inter-Mountain*, Nov. 15: Sometime ago it was stated that the Butte & Boston M. Co. had purchased the Owsley ranch for the purpose of erecting a smelter there. It has since transpired that this company did not buy the ground. It is stated the purchaser was Judge A. J. Davis of the First National bank. The Butte & Boston M. Co. has over 600 acres of ground out near the Silver Bow mill, upon which, it is almost definitely stated, they will put up a large smelter and reduction works in the spring. At present this company is putting down two shafts; one on the La Plata and a three-compartment on the Gray Rock. The Narrow Gauge is still being developed by E. H. Irvine and others. Owing to the heavy fall of snow, work has been stopped on the Alice mill, which was damaged by the recent fire. George Tong is again taking out ore on the Goldsmith. His new hoisting machinery works admirably. Nothing new has been developed lately on the Gambetta, but Gen. Leggat says it is holding its own and is being steadily developed.

OUTSIDE NOTES.—A short time ago mention was made in these columns of a rich discovery in the Saturday Night lode in the Cataract district near Basin. This property is being worked by four men, who are driving a tunnel and taking out an excellent grade of gold and gray copper ore. John Wall one of the owners, was in the city yesterday. He brought in with him 75 sacks of ore from this mine and sold it to the Colorado Smelting Co., for which he was paid \$100 per ton. Mr. Wall says mining operations are very active in the district. The ore in that vicinity is mostly gold-bearing and averages throughout about \$20 per ton. It is claimed that the rock is so simple for reduction that it will pay well at this figure.

OPERATIONS AT THE VOLUNTEER.—*Inter-Mountain*, Nov. 10: The 300-foot station of the Volunteer was reached this week and a station cut. Crosscutting is now in progress. It is expected that the vein will be tapped in about two weeks. At the 200-foot level the ore encountered was found in blocks running northeast and southwest in several places, and after investigating this it was discovered to form a solid shape underneath. The ore was a greenish color, as of copper, and it is believed that when the ledge is found at the 300 it will show up in compact form. The superintendent is very hopeful that this month's development will prove the worth of the property.

UTAH.

PARK NOTES.—*Record*, Nov. 17: The leasers of the Woodside have the usual large force of men at work. The two inclines are being driven to a common point and but few feet remain to be cut through. It is expected that the connection will be made in a day or two, when a good circulation of air will be assured. By this connection being made the vein will be exposed for over 300 feet in length and the distance down the vein from the surface to the footwall will be about 100 feet. About 150 tons of the leasers' ore were shipped to market this week.

CAMP CROSSCUTS.—Daily dividend No. 21 of \$37.50, 25 cents a share, for the month of November has been declared, payable on the 30th. Large quantities of good-sized mining timbers and lagging are being hauled to the mines before the heavy storms set in. The large tank for use by the Russell process at the Marsac mill will be finished in about ten days, and if the necessary iron piping, which has been delayed, arrives before then, the process will be running in full blast in a few weeks. The non-arrival of iron piping from the East still delays the starting up of the machinery at the mouth of the Ontario three-mile drain tunnel.

LUCKY BILL DEVELOPMENTS.—Contractor Geo. Burton will keep a force of men at work on the Lucky Bill all winter. The tunnel is in about 775 feet, which gives a depth of 150 to 200 feet under Flagstaff hill. The footwall is of quartzite, and so far as known the hanging is porphyry. Recently a crosscut was started to the northeast at a point about 90 feet back from the tunnel's face. Great hopes are expressed that the Lucky Bill will soon develop into one of the big ore-producers of the camp.

THE CRESCENT'S DOINGS.—The usual force of 85 men is employed at the Crescent mine. The large pump required to relieve the big incline shaft of water is en route from the East, and as soon as it is put in place sinking will be resumed. The concentrator is doing effective work and will continue to as long as very cold weather keeps away. About 4000 tons of concentrating ore are on the dump.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to anyone who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

Mining Share Market.

There is not very much activity in the mining share market just now, as it does not seem that any of the large operators are in the field. The market seems to be in the hands of the "chippers." Still, if there is no stock boom there is plenty of work in milling and mining on the Comstock. The *Enterprise* says that in Gold Hill, in the Yellow Jacket, Confidence, Challenge, Imperial, Crown Point, Belcher and Seg. Belcher there will be more work done than in many years past, and they are better prepared to do it. The Justice, Alta, Overman and Benton will also do considerable work. As soon as the water question is solved, the Con. Cal. Va., Ophir, Savage, Hale and Norcross, Chollar and Potosi will be made heavy producers of ore for reduction. There is more ore in sight and stripped for extraction than was ever before known to exist on the lode at any time in its history. This fact is notorious.

At the Yellow Jacket a full complement of men was put to work on the 15th, and shipments of ore to the Santiago mill resumed.

Upon the closing down of the California mill (for lack of water), water will be turned on the Pelton wheel at the bottom of the Chollar shaft and the new electric transmission of power will be tested. It is not believed that a regular run will be made, as doubtless the water is just as short for one as it is for the others of the above-named companies.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Eureka Con., Nov. 17, \$19,400; Savage, 17, \$9293; Con. California and Virginia, 17, \$58,000; Mt. Diablo, 17, \$10,434; Confidence, 17, \$33,732; Tajo (Mexico), 17, \$75,000; Los Probes (Mexico), 17, \$10,000; Germania, 13, \$1771; Hanauer, 14, \$2800; Crescent, 14, \$4950; Germania, 14, \$1749; Hanauer, 15, \$3400; Germania, 15, \$3470; Hanauer, 16, \$3340; Germania, 16, \$1898; Hanauer, 17, \$3450; Germania, 17, \$2029; Hanauer, 18, \$3800; Crescent, 18, \$7150; Moulton, 14, \$14,400; Butte and Boston, 14, \$23,008; Con. California and Virginia, 21, \$64,856.

Lixiviation.

EDITORS PRESS.—In my article on "Lixiviation," published on the 17th inst., the printers have made a few mistakes. I am sure that any candid reader understanding the subject could easily overcome these slight obstacles and reach my meaning; but some readers are not candid, as we have had occasion to observe, and you will do me a kindness by inserting the following corrections: First line in second column: for "of polysulphide" read "hy polysulphide." Fourth and fifth lines in third column: for "in the solution of sulphuric acid has been added to the hypo" read "in the solution, if sulphuric acid has been added to the hypo." Penultimate paragraph: for "so pervade and undermine" read "so pervade and undermine." Nov. 18, 1888. C. H. AARON.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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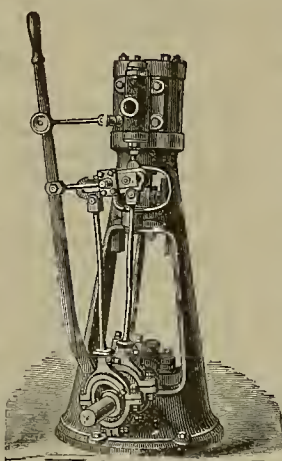
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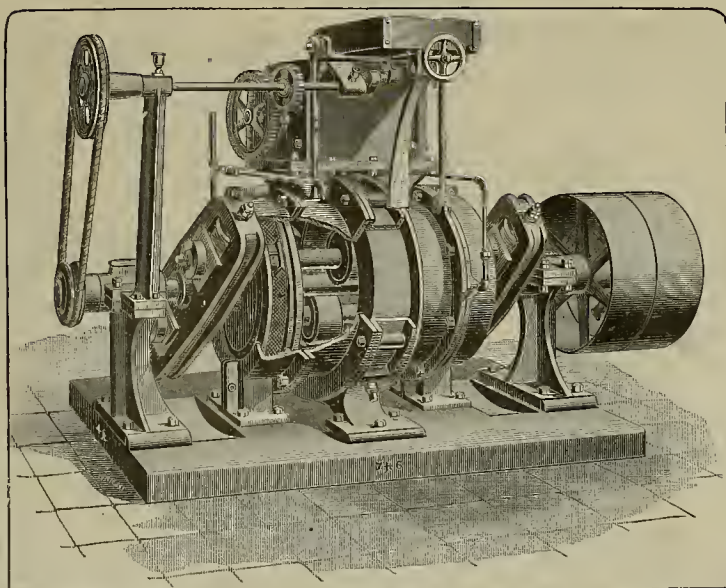
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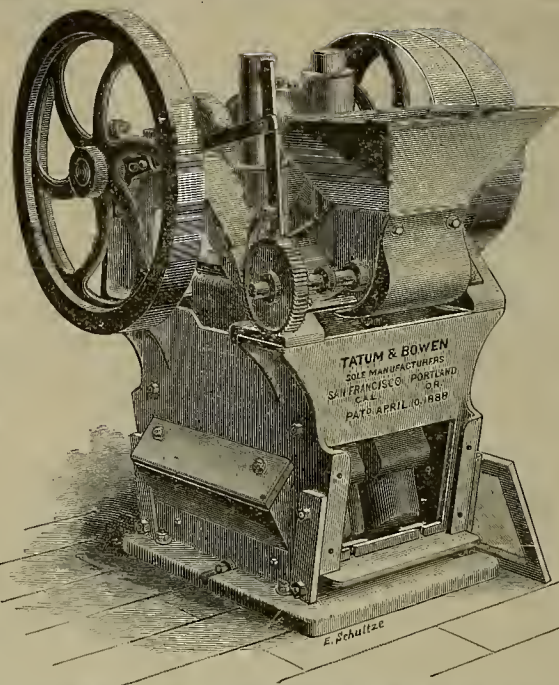
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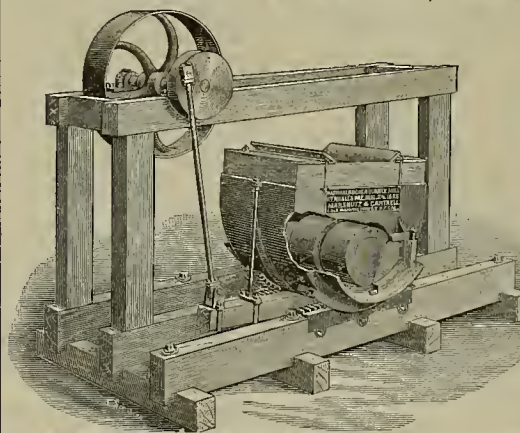
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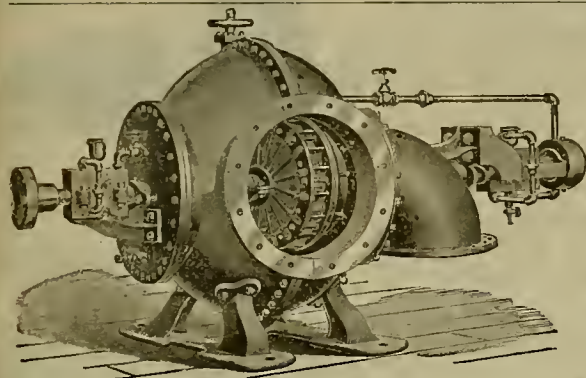
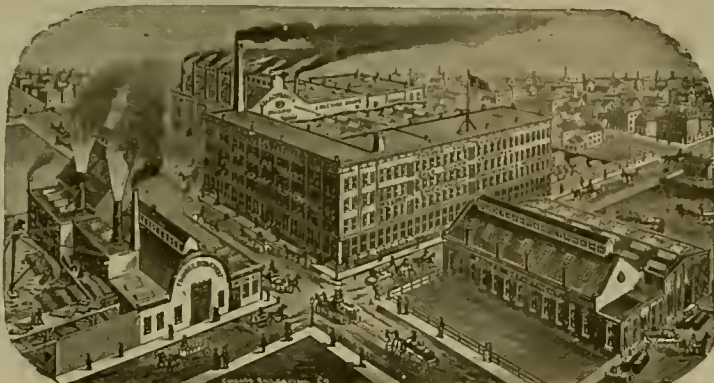
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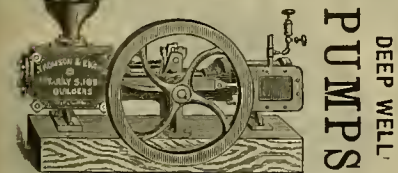
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Market Reports.

Local Market.

SAN FRANCISCO, Nov. 22, 1888.

Stormy weather the past week interfered to a great extent with outdoor trading, but notwithstanding general business kept remarkably good. The local money market is fairly easy, although merchants are said to be remitting to the East in larger sums than for some time. This is reflected in the strong and high prices ruling for exchange on New York. It is claimed that the remittances will aggregate fully 25 per cent more than last year. This opinion is based on the heavy importation of goods, larger than ever before known. Wholesale jobbers in this city report collections in the interior being much closer than for several years past. This is due to less speculation by farmers and dealers, and also farmers having sold their farm products to better advantage. The banks that loan money on mining stocks report that large sums were placed, but latterly the securities appear to be drifting from the public into stronger hands, those who are not compelled to borrow largely. The cause of the public selling is no doubt due to the fact that the large majority have no faith in the reported ore developments in several of the mines. They appear to labor under the impression that the favorable reports are made to foist stock on the outside. During an active stock campaign or deal, all of \$10,000,000 is invested, with at times this sum reaching a much higher figure.

SILVER—The market the past week showed considerable strength, with sales at 93 3/4 @ 93 1/2 c up to Saturday. On Monday, under advice of an advance in the London market, prices with us were worked up from 94 1/4 to 94 3/4 c. Buyers reported silver bullion scarce and difficult to get, except by bidding well up. There is no doubt in certain quarters there is a growing belief that a much higher range of values will obtain. This opinion is founded on confirmed reports that a movement is on foot to form a syndicate having for its object the controlling of the output of the mines, and also the markets of the world. Since our last issue, heavy snowfalls are reported in Nevada, which is said to give ample water-power to start up the mills on Carson river. There can be no doubt but the general public are distrustful of the large ore developments already made and prospective in several of the Comstock mines, believing that the stories are put out chiefly to influence the stock market. Be that as it may, the reports will soon be either verified or disproved; if verified, there ought to be a large increase in silver bullion, unless the ore increases in gold as the work progresses toward the West or Red lode. There is no denying but the Comstock mines are attracting a larger degree of attention than for several years past. Water was brought into the Tuscarora district the past week, which admits of the concentrators starting up. It is claimed there will be quite an increase in the silver bullion output of the mines in the latter district. The silver mines in British Columbia promise to increase their output at an early day in 1889.

London cables received to-day report silver steady at 43 1/2 d. New York telegrams report that market firm at 94 1/2 c. In our market 94 1/2 c is bid without drawing out sellers. Advances from Virginia City report that the water supply is large and all the mills on the river will soon be reducing ore. The bullion output in next month is expected to exceed \$500,000, but what percentage will be silver it is hard to say.

QUICKSILVER—With the rains an improved home call is reported. The export movement is of fair proportion. Arizona and Nevada are taking more than at this time in 1887.

LEAD—The tone of the market is firmer, owing to a more general opinion that no lower range of values will obtain. Holders are not pressing the market at present prices. The demand is slow, and expected to continue so for some time to come, or until the canners start up the forepart of 1889.

COPPER—From all available information there is no doubt but consumers have become accustomed to the higher level for prices, and are therefore more disposed to take hold. The New York *Engineering and Mining Journal* says: A cable from Paris, dated Nov. 4th, says that the copper syndicate has been reorganized with a capital of \$6,000,000, so as to be thoroughly within the French law, the former syndicate having been made precarious by the law against monopoly. The new company is now regularly organized, and has just concluded an agreement with the Rio Tinto Company to purchase all its product of copper for 15 years to come, instead of three years, as now. Other companies will shortly make a similar contract.

TIN—The dullness reported in last week's issue is continued. The high freights from England to this city, and the firmness of the market there, combined with canners' first wants next season having been met, are the main features in promoting the present dullness.

BORAX—The market is reported very firm. The following from the New York *Commercial Bulletin* throws some light on the present situation: As we have noticed in frequent instances in the past, the tendency of the borax market, under "pool" manipulation, is strongly upward. To-morrow (Thursday) the dealers will again advance their ideas to a basis that will admit of a profit upon the recent quotations of the combination, or say to 8c for concentrated in car lots, 8 1/2 c for refined and 9c for powdered, with an eighth to a quarter cent per lb added for less quantities. The stock of concentrated to-day is estimated to not exceed 500 bags, and the above price is only to cover this quantity in store, as sellers will not book orders for delivery the remainder after the turn is made, as they feel confident that a further appreciation will occur at about that time. The Chas. E. Moody is due about the 10th of the coming month with 150,000 lbs refined, but of this quantity 117,000 lbs have already been sold.

IRON—The market is very dull. Iron workers are offish and not disposed to anticipate their wants. From present appearances it looks as if concessions

Mining and Scientific Press.

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Alta S M Co.	Nevada.	38.	50.	Sept 28.	Nov 5.	Nov 26.	L Osborn.	309 Montgomery St
Andes S M Co.	Nevada.	34.	25.	Oct 5.	Nov 12.	Dec 3.	B Burris.	309 Montgomery St
Alpha Con M Co.	Nevada.	21.	87 1/2.	Nov 3.	Dec 8.	Dec 28.	E E Elliott.	309 Montgomery St
Alpha Con M & M Co.	Nevada.	2.	25.	Nov 3.	Dec 8.	Dec 28.	E E Elliott.	309 Montgomery St
Bodie Con M Co.	California.	9.	50.	Sept 24.	Oct 29.	Nov 30.	G W Sessions.	309 Montgomery St
Best & Belcher M Co.	Nevada.	41.	25.	Oct 16.	Nov 21.	Dec 11.	L Osborn.	309 Montgomery St
Benton Con M Co.	Nevada.	18.	150.	Oct 29.	Dec 3.	Dec 24.	V W Allen.	336 Pine St
Crown Point G & S M Co.	Nevada.	50.	50.	Oct 2.	Nov 5.	Nov 26.	J Newlands.	339 Pine St
Cholla M Co.	Nevada.	26.	50.	Oct 8.	Nov 13.	Dec 5.	E E Elliot.	309 Montgomery St
Con Imperial M Co.	Nevada.	25.	50.	Oct 16.	Nov 21.	Dec 12.	C L McCoy.	339 Pine St
Caledonia S M Co.	Nevada.	43.	15.	Oct 19.	Nov 21.	Dec 12.	A S Groth.	414 California St
Del Monte M Co.	Nevada.	1.	25.	Oct 15.	Nov 20.	Dec 12.	J W Pew.	310 Pine St
Foundry & Machine Co.	Nevada.	4.	96.	Oct 25.	Nov 30.	Dec 21.	J W Stadfield.	309 Montgomery St
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Grand Prize M Co.	Nevada.	19.	25.	Oct 13.	Nov 17.	Dec 5.	R R Grayson.	327 Pine St
Gray Eagle M Co.	Nevada.	10.	50.	Nov 13.	Dec 18.	Jan 8.	O H Bogart.	327 Pine St
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North Belle Isle M Co.	Nevada.	13.	50.	Oct 23.	Nov 27.	Dec 19.	J W Pew.	310 Pine St
North Con monwealth M Co.	Nevada.	1.	30.	Oct 15.	Nov 19.	Dec 11.	J W Pew.	310 Pine St
Potosi M Co.	Nevada.	31.	50.	Oct 1.	Nov 6.	Nov 27.	O E Elliot.	309 Montgomery St
Puget Sound Iron Co.	Wash Ter.	12.	140.	Oct 23.	Nov 29.	Dec 21.	A H Halsey.	328 Montgomery St
Russell Reduction & M Co.	California.	3.	10.	Oct 13.	Nov 26.	Dec 17.	J Morizo.	328 Montgomery St
Savage M Co.	Nevada.	71.	50.	Oct 4.	Nov 7.	Nov 27.	E B Holmes.	309 Montgomery St
Sierra Nevada M Co.	Nevada.	93.	25.	Nov 9.	Dec 13.	Jan 2.	E L Parker.	309 Montgomery St
Tuscarora Con M Co.	Nevada.	1.	65.	Oct 1.	Nov 14.	Dec 5.	J J Scoville.	309 Montgomery St
Utah Con M Co.	Nevada.	5.	35.	Oct 4.	Nov 8.	Nov 26.	A H Fish.	309 Montgomery St
Wm Penn M & M Co.	Nevada.	3.	10.	Nov 8.	Dec 17.	Dec 31.	J J Scoville.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Baltimore M Co.	Nevada.	A R Crim.	402 Montgomery St.	Annual.	Dec 4
California State Co.	California.	J O Hanson.	10 California St.	Annual.	Dec 2
Kentuck M Co.	Nevada.	J W Pew.	309 Montgomery St.	Annual.	Nov 23
Mexican M Co.	Nevada.	G E Elliott.	309 Montgomery St.	Annual.	Dec 4
Tuscarora Con M Co.	Nevada.	J J Scoville.	309 Montgomery St.	Special.	Dec 4

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A W Havens.	309 Montgomery St.	50	Oct 11
Confidence S M Co.	Nevada.	A S Groth.	309 Montgomery St.	1.00	Aug 6
Caledonia M Co.	Nevada.	A S Cheminist.	328 Montgomery St.	68	Nov 26
Candelaria Con M Co.	Mexico.	G T Givens.	222 Market St.	50	Nov 12
Eureka Con M Co.	Nevada.	H P Burton.	309 Montgomery St.	50	Nov 12
El Diablo M & M Co.	Nevada.	D R Jenning.	313 Pine St.	25	Aug 27
North Star M Co.	California.	D A W Jenkins.	401 California St.	50	Nov 11
Hale & Norcross S M Co.	Nevada.	J F Lightner.	309 Montgomery St.	50	Aug 8
Idaho M Co.	California.	J F Lightner.	Grass Valley.	50	Oct 11

will have to be made so as to bring in new business, and this is hardly likely with the market abroad firm and freights at the present high rates. The determination of the Pacific Steamship Co. to have a new iron steamer made abroad is not considered in a favorable light by those who have dealings with the company.

COAL—Confirmatory reports continue to be received that new mines on this coast are being opened up, which, coupled with the increased facilities for enlarging the output of the older mines, cause many to believe that it is only a question of time when the wants of this coast will be met by this coast. Australian cable advices report more vessels on berth for this city. In our market the demand is reported active for all kinds at full prices.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Nov. 22, 1888.—The following are the closing prices the past week:

	Silver in Silver in London.	New York.	Copper.	Lead.	Tin.
Thursday.....	43	93 1/2	81 1/2	45	\$22 35
Friday.....	43	93 1/2	17 35	3 70	22 40
Saturday.....	43	93 1/2	17 50	3 67 1/2	22 35
Monday.....	43 1/2	94	17 50	3 67 1/2	22 35
Tuesday.....	43 1/2	94 1/2	17 35	3 62 1/2	22 35
Wednesday.....	43 1/2	94 1/2	17 00	3 62 1/2	22 40

The market closed as follows: In Lake Ingot copper a November sale of 25,000 lbs was reported at 17 1/2 c. The market seems to be in a shut-down sort of condition. Early future pig lead sold at \$3.65 @ 3.70. The trade cannot run smoothly until the locked-up stock is released from outside interests. Petroleum—Refined was quoted as follows: Bbls, \$7.30; plain cases, \$9.30. Borax was steady, and sales were made at higher rates. California refined sold at 8 1/2 @ 9 c, concentrated at 8 @ 8 1/2 c. Quicksilver was easier at 60 @ 62.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Biliton Tin, \$24.50 @—; Banca Tin, \$24.25 @ 24.50; Baltimore Copper, \$— @—; Orford Copper, \$16.00 @ 16.25; P. S. C. Copper, @—; Foreign Lead, \$4.75 @ 5.00; Foreign Speltz, \$6.00 @ 6.25; Antimony, \$10.00 @ 13.50.

TIN—Has shown the most irregularity in prices, but has been dull; sales of only 40 tons in all being reported. A decline of 20 points in spot on Monday brought futures to a premium, and this relation has been since maintained; the whole market hardening on Wednesday, and then growing steadily easier, until at the close, prices show a net decline for the week of 50 points on spot, and 15 @ 20 on futures, having recovered slightly from yesterday.

COPPER—Has been extremely dull; the record of sales being again a total blank. The movement of prices has been nominal, therefore, consisting of an advance of a quarter cent in the first half, and a reaction of five to ten points later on.

LEAD—Has been unsettled although dull, with sales of about 250 tons. The first prices were five to ten points higher, and after a loss of ten points on Monday, they have again improved five points; so that the net change is very slight, but shows a fractional advance.

SPELTZ—Has received no attention whatever, all the prices reported being purely nominal.

PIG IRON—There is no change of any importance, the reported "blowing in" of furnaces having a tendency to check the inclination toward higher figures. The supply is quite small, hence steadiness in prices.

STEEL RAILS—There is a better feeling, as inquiries are on the market for at least 100,000 tons from good buyers. Sellers are not inclined to meet the low prices made earlier in the month; however, neither are buyers ready to pay an advance, so that there is a stand-off for the present.

OLD RAILS—The offerings are a little larger, and the feeling slightly easier. Buyers are not bidding over \$23 Spot Philadelphia for T's, and are not anxious for large lots at that figure.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 1.	WEEK ENDING Nov. 8.	WEEK ENDING Nov. 15.	WEEK ENDING Nov. 22.
Alpha.....	3.15	3.85	3.25	3.50
Alta.....	2.20	3.10	2.50	3.50
Andes.....	1.30	1.50	1.20	1.80
Argenta.....	1.10	1.10	1.10	1.10
Belcher.....	7.25	9.00	7.75	8.00
Best & Belcher.....	7 1/2	8 1/2	7 1/2	8 1/2
Bullion.....	1.70	3.00	1.10	1.95
Baltimore.....	.70	.55	.70	.75
Belle Isle.....	.50	.50	.50	.50
Sodie Con.....	1.75	2.30	2.00	2.10
Senton.....	2.50	3.00	1.25	1.75
Sodie Tunnel.....	.70	.90	.70	.80
Salway.....	.70	.90	.70	.80
Con. Va. & Cal.....	10 1/2	11 1/2	10 1/2	11 1/2
Challenge.....	6.50	8.00	7 1/2	7.75
Champion.....	3.65	4.25	3.50	4.00
Chollar.....	3.65	4.25	3.50	4.00
Confidence.....	20	22	20	22
Con. Imperial.....	.85	1.20	1.00	1.10
Caledonia.....	.55	.65	.60	.65
Con. Pacific.....	.25	.50	.25	.50
Crown Point.....	.25	.50	.25	.50
Brocker.....	.30	1.00	.35	1.00
Central.....	.40	.45	.40	.45
Dudley.....	.40	.45	.40	.45
East B. & B.....	.40	.45	.40	.45
Eureka Con.....	.55	1.25	1.20	1.50
Excelsior.....	1.00	1.25	1.20	1.50
Grand Prize.....	.50	.50	.50	.50
Gould & Curry.....	1.55	5.40	4.95	5.00
Hale & Norcross.....	.60	6.75	6.00	6.25
Independence.....	.75	.95	.65	.70
Julia.....	.45	.65	.60	.55
Justice.....	1.80	2.50	2.15	2.65
Kentuck.....	3.40	3.90	3.50	3.85
Lady Wash.....	.60	.70	.65	.70
Martin White.....	1.60	1.85	1.50	1.60
Mono.....	.50	.50	.50	.50
Mexican.....	4.50	5.40	5.25	4.95
Mt. Diablo.....	.20	.20	.20	.20
Northern Belle.....	.20	.20	.20	.20
Navajo.....	2.30	2.70	2.60	2.50
North Belle Isle.....	2.50	2.80	2.20	2.30
Niagara.....	3.20	3.30	3.00	2.90
New Queen.....	.45	.45	.45	.45
Occidental.....	2.15	2.95	2.20	2.70
Ophir.....	.75	8.50	.75	8.75
Overman.....	2.50	2.50	2.25	2.50
Potosi.....	3.40	4.05	3.25	4.00
Peerless.....	1.70	2.00	1.50	1.80
Perr.....	.60	.70	.55	.70
P. Sheridan.....	.10	.10	.10	.10
Silver Star.....	4.65	5.75	4.65	5.25
Savage.....	3.90	4.55	3.90	4.55
S. B. & M.....	4.25	4.85	4.20	4.85
Sierra Nevada.....	.80	.80	.75	.80
Silver King.....	.70	.70	.70	.70
Scorpion.....	.70	.70	.70	.70
Syndicate.....	.10	.10	.10	.10
Union Con.....	4.50	7.40	4.50	4.80
Yellow Jacket.....	1.55	1.70	1.40	1.55
250 Justice.....	7.00	6.70	7.00	6.50

Sales at San Francisco Stock Exchange.

THURSDAY, Nov. 22.	150	Lady Wash.....	70c
220 Alta.....	3.50	20 Kentuck.....	3.50
200 Andes.....	1.55	700 Mexican.....	4.50
300 Alpha.....	3.55	60 N. Belle Is.....	1.35
300 Argenta.....	1.00	100 Nev. Queen.....	3.00
400 Belcher.....	7 1/2	500 N Occidental.....	1.25
1035 B. & Belcher.....	7 1/2	50 Overman.....	2.10
400 Baltimore.....	.70	75 Ophir.....	7.50
350 Bullion.....	3.00	500 Occidental.....	1.25
500 Caledonia.....	.65	500 Potosi.....	4.15
110 Chollar.....	4.50	450 Savage.....	5.00
110 Con Va. & Cal.....	.50	300 S. B. & M.....	3.90
350 Crown Point.....	8.60	300 Sierra Nevada.....	4.60
210 Challenge.....	.75	20 Silver King.....	1.40
2150 Con. Imperial.....	1.20	200 Utan.....	1.70
100 Excelsior.....	1.60	230 Union.....	3.85
830 Gould & Curry.....	5.40	100 Weldon.....	1.55
145 Hale & Norcross.....	6.75	300 W Comstock.....	1.00
250 Justice.....	2.25	150 Yellow Jacket.....	6.25

It is believed that Alaskan coal could be delivered on shipboard at \$2 per ton and freighted to San Diego at \$4.

THE CALIFORNIA CONSOLIDATED Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leifer, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two locations. Ore assays 57 per cent. average. Coarse gold, solid rock vein from 16 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

Assessment Notices.

William Penn Mill and Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Devil's Gate Mining District, Lyon county, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 8th day of November, 1888, an Assessment (No. 3) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 59, Nevada Block, No. 309 Montgomery street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 13th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 31st day of December, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. J. SCOVILLE, Secretary.

OFFICE—Room 59, No. 309 Montgomery street, San Francisco, California.

Lord of Lorn Gold and Silver Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 13th day of November, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company,

HORACE D. RANLETT,
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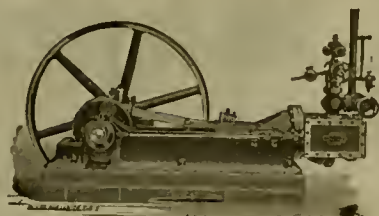
Special attention given to management and sales of
mines and purchase and shipment of copper produce

THE BUFFALO CONSOLIDATED GOLD
Mining Company, Sierra City, Cal., Ernest Busch, Su-
perintendent. Stock divided into 600,000 shares at \$1 per
share. The property comprises 5 locations. Ore, finely de-
composed, carries coarse gold. Size of ledge: Tunnel No.
1, 32 ft.; No. 2, 94 ft.; No. 3, 10 ft. Fine black decomposed
rock interspersed with white quartz. New 10-stamp mill run
by a Pelton Wheel, blacksmith shop and boarding house.
Stockholders: Ernest Busch, Hugh Murray, Frank Cook,
J. G. Lee, Henry Carpenter. For further information ap-
ply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

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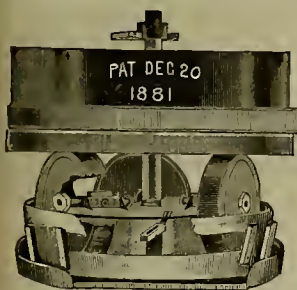
E. E. EYRE, President. JOS. H. GRAHAM, Vice-Pres. & Manager. O. M. PINCKARD, Sec'y.
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low cost of working. The first one crusher used in Durango, Mexi-
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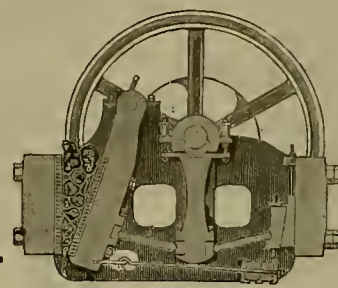
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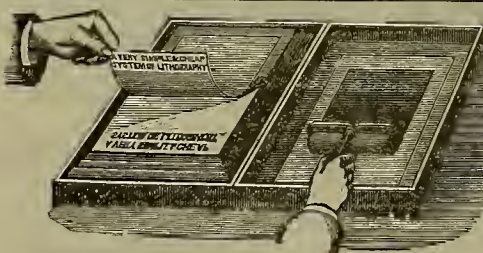


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SAUL SAMUEL,

The Agent-General for New South Wales.

1st November, 1888.

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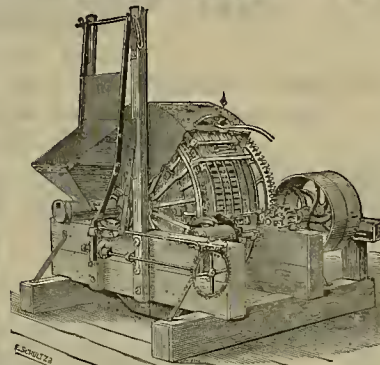
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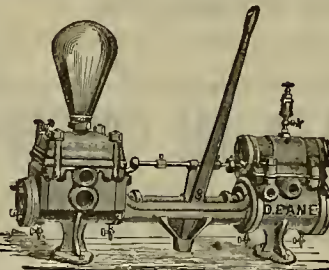
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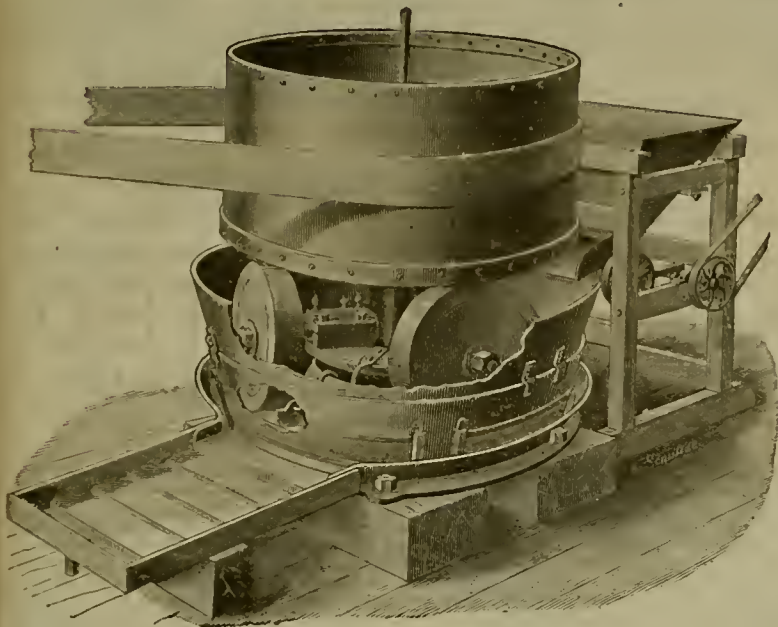
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Full Descriptive Circulars of any of the above sent on application.

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

Risdon Iron Works, San Francisco.—GENTLEMEN: Our Company has been operating three of the 4-foot Bryan Roller Quartz Mills one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60-mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set

of Tyres will crush 1500 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "peon" earning one dollar per day has complete charge. In regard to cleaning, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismantled in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequaled by any mill now in existence.

Yours truly,

D. M. BURNS, Superintendent.



1850. — BUILDERS OF — 1888.

MINING MACHINERY.

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PLANTS FOR GOLD AND SILVER MILLS, embracing machinery of LATEST DESIGN and MOST IMPROVED construction. We offer our customers the BEST RESULTS OF 38 YEARS' EXPERIENCE in this SPECIAL LINE of work, and are PREPARED to furnish the MOST APPROVED character of MINING AND REDUCTION MACHINERY, adapted to all grades of ores and SUPERIOR to that of any other make, at the LOWEST POSSIBLE PRICES.

We are also prepared to CONSTRUCT and DELIVER in COMPLETE RUNNING ORDER, in any locality, MILLS, CONCENTRATION WORKS, WATER JACKET SMELTING FURNACES, HOISTING WORKS, PUMPING MACHINERY, ETC., ETC., of any DESIRED CAPACITY.

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It will also add from 40 to 50 per cent to the capacity of any mill by fine work. The adoption of this Crusher will return 10 per cent per month on its cost over and above that of any other in use.

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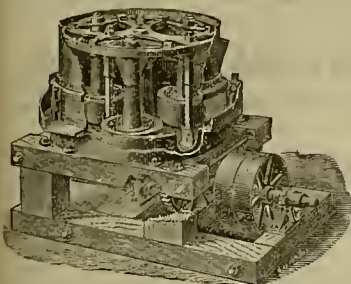
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Mining Machinery of Every Description,

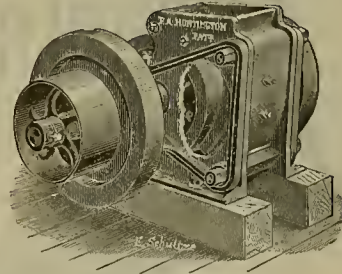
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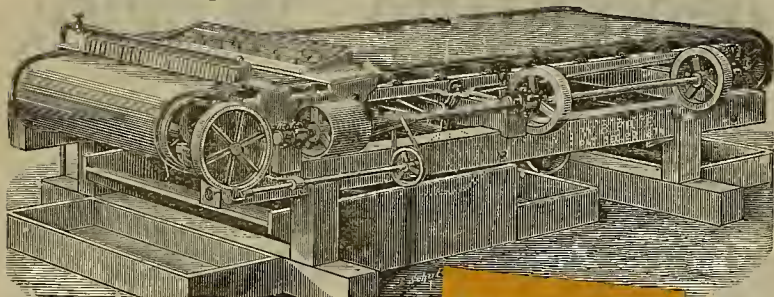
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THE FRUE ORE CONCENTRATOR
OR VANNING MACHINE.

PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS (\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.

DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

ADAMS & CARTER.

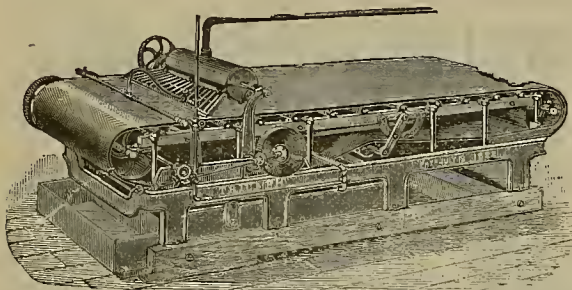
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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\$1,000 CHALLENGE ACCEPTED, PRICE, FIVE HUNDRED AND FIFTY DOLLARS (\$550.00).



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The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machine, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insure their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

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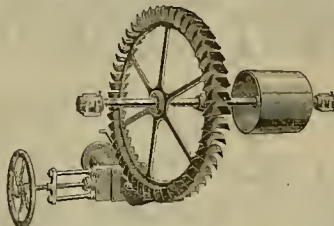
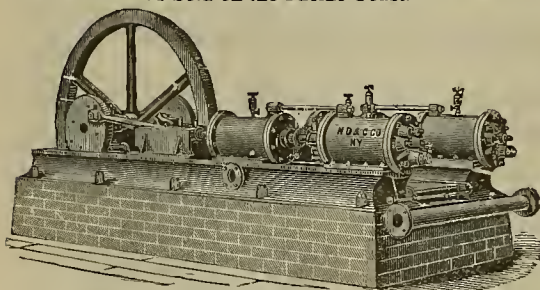
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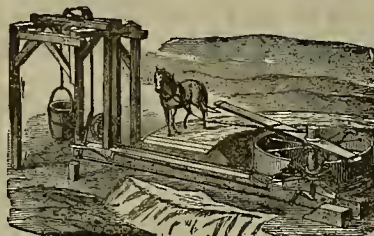
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NATIONAL AIR COMPRESSORS.

SINGLE OR DUPLEX, STEAM OR BELT POWER.
62 Sold on the Pacific Coast.



KNIGHT'S WATER WHEEL,
—FOR—
MILLS, PUMPING AND HOISTING.
Over 300 in use. All estimates guaranteed. Send for Circular.



MINERS' HORSE WHIM.

All wrought iron. No gears, no breakage. One horse will easily handle rock or water to a depth of 350 feet, giving entire satisfaction to the prospector. Price, complete, \$200. 150 sold on this Coast.



NATIONAL ROCK DRILL.
200 Sold on this Coast. Has less repairs than any other Drill.



NOTICE TO GOLD MINERS! SILVER-PLATED AMALGAMATED PLATES For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
FULL WEIGHT OF SILVER AND BEST QUALITY OF WORK GUARANTEED.

GET OUR PRICES BEFORE ORDERING ELSEWHERE. SAMPLES FURNISHED ON APPLICATION.

SAN FRANCISCO NOVELTY AND PLATING WORKS,
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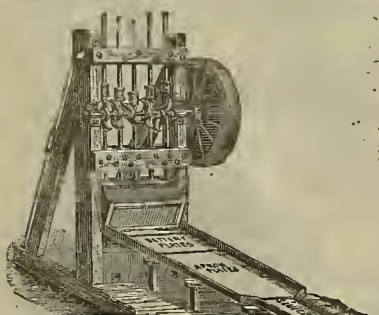
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These Plates can also be purchased of **JOHN TAYLOR & CO.**, Corner First and Mission Sts.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 1, 1888.

VOLUME LVI.
Number 22.

Electric-Power in Mining.

A test run on trial of the Nevada 60-stamp mill was made on Saturday, with electric power generated by dynamos, operated by Pelton water-wheels, on the Sutro-tunnel level of the Chollar incline, 1700 feet below the surface, and transmitted by a copper wire to motors on the surface. It was satisfactory in every respect. The plant is the largest of the kind in the world. We shall shortly give a detailed description of the plant. The success of this experiment is considered of vast importance to the future of the Comstock, as the water-power of the Truckee river can be brought to Virginia City with a loss of only 40 per cent of its original power. The Truckee river is distant but 16 miles in an air line, and by taking advantage of its fall, a thousand stamps can be operated on the Comstock at a cost which will make it profitable to handle millions of tons of low-grade ore.

Electricity is also employed successfully at the Veteran tunnel, Aspen, Col., in hoisting and other works. At that place the dynamo is run, too, by a Pelton water-wheel, giving a good deal more power even than is required. The supply of water to the wheel is automatically regulated. The generating plant is 1½ miles from the motors. A motor and hoist are placed 1000 feet in from the mouth of the tunnel. The speed and power of the motor are controlled by a single switch.

This plant has been in use for some months and has given perfect satisfaction as regards economy and promptness of operation; besides the hoist it pulls in the loaded or empty cars, and controls the speed of all the trains running on the tramway and in the tunnel. Formerly one man was required to each car, making the round trip in 20 minutes; but now the entire train is sent out and returned in eight minutes. Twenty cars are handled rapidly and continuously if necessary.

It will also shortly be utilized for hoisting in the incline running from the Veteran tunnel to the workings of the Franklin mine, 200 feet below. A duplicate of this plant will shortly be erected in another portion of the Veteran tunnel, where a station is cut out to receive it. Another Sprague motor and plant will soon be supplied in the Regent mine.

The utilization of electricity for power in this way has opened a very large field of usefulness for the Pelton water-wheel, which is considered one of the most important inventions California has contributed to the world of mechanics. It takes up so little room, and does its work so well, with so little loss of power, that its fame is now world-wide, and it is in use in most countries where mining is carried on.

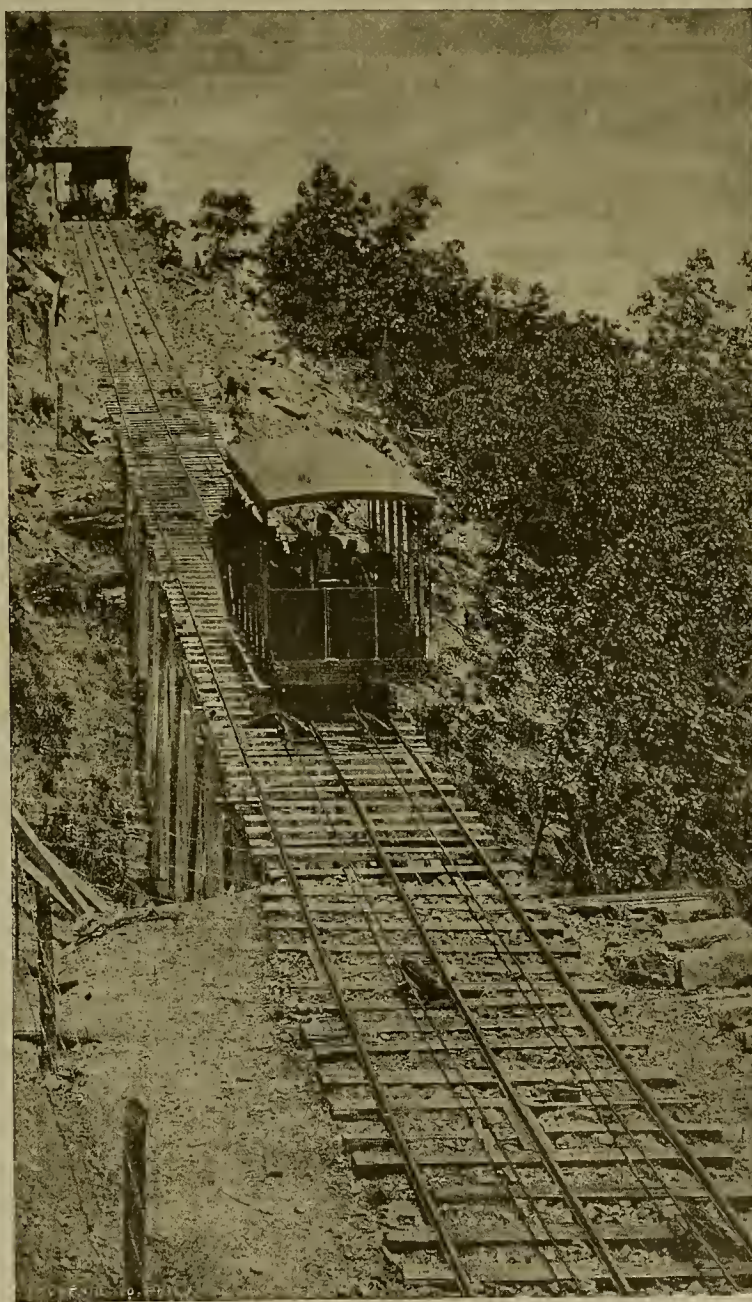
ON Tuesday afternoon the fly-wheel of the Bullion mine hoisting engine on the Comstock burst while the cage was being brought to the surface. The cage went crashing in the sheaves, ripping a section off the hoisting works roof. Fragments of the fly-wheel were hurled in every direction, but no one was injured.

M. R. EVANS has developed what promises to be valuable clay and ochre beds in Thistle canyon. Samples he was showing yesterday would make excellent Rochelle ochre, and good, cheap Venetian red.

It is rumored that reduction works to cost \$1,500,000 are to be erected on the Comstock.

MINING CO. WEEKLY REPORTS.—Mannel Eyre has filed suits in the Superior Court against the Directors of the Challenge Consolidated and the Consolidated Imperial Mining Cos. Eyre avers that he is a stockholder in

ON the night of November 17th a slide occurred at the back of the Lost Confidence mine, on Iron mountain, Shasta county, which buried the new roasting works and machinery 70 feet deep, and it is feared that the whole



VIEW ON UPPER PORTION OF THE INCLINE RAILWAY.

both companies, and that the directors have neglected to comply with the legislative Act requiring directors of mining companies to post in a conspicuous place in the company's office a weekly report of receipts and disbursements, and also the report of the superintendent. He sues to recover \$1000 damages from each company for the neglect. Eyre is the plaintiff in eight or ten similar suits against other mining companies.

plant is destroyed. The company had dug about 30 feet into the hill for the purpose of opening out a good site for its mill, having perfect faith in the security of the location. Damages estimated at \$7000.

A DISPATCH from Albany, Oregon, says that Philadelphia capitalists are about to open and develop the coal deposits on the Santiam river, in Linn county.

An Incline Railway.

Among the engineering plants with new features and deserving details which are being brought to the working stage in the Southern States, one of great interest is the incline railway, built from the base to the summit of Lookout mountain, near Chattanooga, Tennessee. As compared with other inclines employed to overcome mountain heights, this work is a new departure, and the details by which many of the problems that vex the mining engineer also are cleverly solved will prove interesting. The railway is described by W. H. Adams before the American Institute of Mining Engineers, the details having been given by Major W. R. King, U. S. Engineer, who projected the road and saw it completed under his own supervision.

By reference to Fig. 1 (page 361), showing the railway in plan and profile, with cuts, fills, trestles, etc., it will be seen that the line is straight for 1250 feet, commencing at the base, curves to the left for 250 feet, thence runs in a tangent about 800 feet (which distance covers the switches or passing-points for the cars), thence curves to the right for 1400 feet, and finishes with a stretch of straight line for 600 feet to the base of bare rock which marks the crest of the mountain, 1500 feet above the river level. The length of the track is 4360 feet, and the elevation attained is 1170 feet, or, say one foot of rise to 3½ of length. The problems required to be solved, the difficulties encountered in the nature of the surface, and the methods of overcoming all obstacles will be partially appreciated by reference to plans and photographs.

Cable lines in cities are the nearest approach to the methods here employed, but a close study of the special features which mark this new departure for surface working will be of particular benefit to those engaged in mine engineering.

Midway on the plan (Fig. 1 enlarged in Fig. 2) the outer rails are shown as diverging, and the central rail opens out or doubles for a distance of 200 feet, forming two independent tracks or switches. This very unusual plan of a three-rail road, from end to end, was adopted for many reasons. No movable parts are used at any point on the track, and solidity is assured by the extra width of the roadbed. Sufficient space and play are given for the rapidly moving cables to hold the center of the separated tracks at all times, the grooved guide-wheels, carefully spaced, holding the cars to the curves as evenly and truly as on the straight track.

The view on this page is on the upper portion of the incline, showing a car crossing one of the trestles. The oblique wheels carrying the cable are also seen. As this illustration is a Levy-type from a photographic negative taken on a bright day, the shadows of the two cables are very distinct. They should not be mistaken for extra cables. In the PRESS of next week we shall give further details of this peculiar mountain railroad.

THE reported sale of the Cuyamaca & Eastern railroad, San Diego county, to the Union Pacific is confirmed at San Diego by a very high official of the Santa Fe, who claims to know that the transaction is consummated; also by a Chicago, Burlington & Quincy official now in California.

THE export of salt from Syracuse is now one train daily, the present tonnage being at the rate of 2500 tons per month.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Concrete.

History of its Manufacture.

[Written for the Press.]

By the term cements is meant in architecture certain substances which by their interposition cause the surfaces of solid bodies to adhere together or unite, the action being either mechanical or chemical, or both. Four thousand years ago the Egyptians not only used common mortar in the construction of their buildings, but could make a mixture which would set and harden under water.

In the Pyramid of Cheops a mixture of Nile mud and gypsum is supposed to have been used. In addition to this, the analysis made by Dr. Malcomson of Madras gives a proportion of 18½ per cent soluble salts, principally the sulphate of lime; a small quantity of the sulphate of soda, and a trace of the muriate. These last no doubt were derived from the impure water which is still found in the neighborhood of the pyramids. At Nineveh the pictures in bas-relief and foundations were chiefly composed of alabaster. The Babylonians not having this material, made bricks and covered them with plaster. The Bible tells us that it was upon the plaster of the wall in Belshazzar's palace that the mystic writing appeared. The Greeks, whose civilization anticipated that of the Romans, used various mortars and cements as seen at present in the remains of their ancient temples. It remained for the Romans, however, to advance the arts of architecture and engineering, bringing them to a perfection hitherto unknown.

For the Construction of Piers and Harbors

In the Mediterranean, they used a concrete composed of broken stones and mortar. Among their stutest monuments may be mentioned the mols or breakwater at Pozzuoli. It was composed of 24 arches sustained upon piers built of brick and faced with stone. These were held together by a material to which they gave the name of Pozzuolana, which they used in conjunction with lime. In the ancient work of Vitruvius we find the following: "There is found in the neighborhood of Baë, and the municipal land lying at the foot of Vesuvius, a kind of powder which produces admirable effects when mixed with lime and small stones. It has not only the advantage of giving great solidity to common buildings, but possesses the further property of forming masses of masonry which harden under water." The piers were built more than 1800 years ago. Thirteen of them still remain, and had the first breaks been repaired, the structure would have remained complete until the present day. The arch construction was ingeniously contrived to prevent the accumulation of sand behind the mole.

To this day, in the south of Europe, lime when slacked is put in boxes and kept for a long time, the idea being that greater strength is gained by it for the purpose of imparting increased hydraulic energy to pozzuolanas.

In Vichat's treatise on calcareous mortars and cements (1837) I find the following description in his preface of concrete, as known and used previous to his time of writing: "The art of

Composing Calcareous Cement

Was confined, till within the last few years, to the knowledge of a small number of facts, and to the observance of certain rules long since admitted into use without examination on the authority of Vitruvius and the architects who followed him. But the rules were always found to be at fault, and the facts for want of correlativeness were of but little aid. * * * It was not the less necessary to work by guess in most instances, or to trust to obscure analogy for the success of the most important work."

The hydraulic cements chiefly employed in Europe are the Roman, Portland, Medina, Mulgrave and those made on the Continent from Pozzuolana, Trass, Santorin and Teil lime. The first modern Roman cement was made by Mr. Parker of London, who patented his process in 1796. All Roman cement contains a marked quantity of iron, as may be seen from the following analysis:

	1	2	3	4
Lime.....	55.33	55.50	47.83	53.88
Magnesia.....	5.00	1.73	2.4	2.25
Silicic acid.....	23.83	25.01	8.83	23.60
Alumina.....	6.41	9.03	1.61	7.24
Oxide of iron.....	4.80	9.63	29.80	7.97

English Roman cement is now made from a clay shale found above the chalk formation on the Isles of Sheppy and Wight. It is, therefore, a natural cement. Mr. Parker made it from nodules termed "septaria," found in Kimmeridge and London clay. These were calcined almost to the point of vitrification, and then crushed to a fine powder without admixture of any other material.

The English and German methods differ somewhat. I may call them the wet and the dry. In England, the method consists in mixing the materials together with water, and then grinding them to a pulp, which, after evaporation to a proper consistence, is made into bricks which are dried and then calcined to near the point of vitrification, after which they are ground to a fine powder. The proportions of

the ingredients are from 65 to 75 per cent of chalk to 25 or 35 per cent of clay.

Portland Cement.

Which is the main ingredient in the manufacture of the concrete of this present day, is an artificial production, and is so called from its resemblance to Portland stones. It was first manufactured by Joseph Aspdin of Leeds, England. His patents, granted in 1824, have been much improved upon. Mr. Aspdin's method was to pulverize this limestone and burn it in a kiln, then to add an equal weight of clay and thoroughly knead the mixture with water to a plastic mass, which was dried, broken in pieces and again burnt to expel all the carbonic acid. Of late years, however, it has been found that it is better to have the lime in a state of carbonate, when it is mixed with the proper clay, and accordingly chalk has been used instead of limestone on account of its cheapness and the facility of procuring it.

The German Method

Consists in first drying the materials and separately reducing them to powder. They are then mixed with water in the proper proportion and made into bricks, which are then dried, calcined and ground. A small amount of alkali is also added, either soda or potash, depending upon the amount already contained in the clay. By thus bringing the amount to about 5 per cent of the whole, a soluble silicate is formed which will act upon the lime in setting. Occasionally also a small quantity of ground quartz or sand is added. The following is an analysis of four varieties of Portland cement as given by Michaelis: 1 and 4 are English P. cements, 2 is made at Stettin, 3 at Wildau:

	1	2	3	4
Lime.....	59.06	62.81	60.33	55.06
Silicic acid.....	24.07	23.22	25.98	22.92
Alumina.....	6.92	8.37	7.04	8.00
Oxide of iron.....	3.41	2.00	2.46	5.46
Magnesia.....	0.82	1.14	0.23	0.77
Potash.....	0.73	1.27	0.94	1.13
Soda.....	0.87	0.30	0.30	1.70
Sulphate of lime.....	2.85	1.30	1.52	1.75
Clay sand.....	1.47	2.54	1.04	2.27

Trass or Teras is a substance very like Pozzuolana. It is a blue-black trap rock found in the valley of the Rhine; it is of volcanic origin also, and can be treated with lime in a similar manner to the Italian product. It is much used by the Dutch engineers for hydraulic works in Holland. Wagner gives the following table of comparative analysis:

Constituents.	Pozzuolana.	Trass Soluble in H C	Trass Insoluble in H C
Silica.....	44.5	11.50	37.44
Lime.....	8.8	3.16	2.25
Magnesia.....	4.7	2.15	0.27
Potash.....	5	0.29	0.05
Soda.....	1.5	2.44	1.12
Alumina.....	15.0	17.70	1.25
Oxide of iron.....	12.0	11.17	0.75
Water.....	9.2	7.65	....
Totals.....	99.7	56.06	43.16

I give the analysis of these clays in order that the attention of miners and prospectors may be drawn to them. There is an amount of similar material in California. Its discovery and the establishment of manufactories on this coast is but a question of time.

General Pasley is looked upon as the founder of artificial-cement manufacture in England. During the year 1826 he experimented with mud taken from the River Medway, burning it with limestone or chalk. This mud having argillaceous properties and containing sodium salts, was well adapted for the purpose. Other materials are now used, such as marls mixed with clay and usually the deposits at the deltas of rivers.

At Teil, in the Department of Ardeche, in France, a hydraulic lime has been found which possesses properties that eminently qualify it for use in marine construction, as it eats and hardens well under salt water.

Rivot gives the following analysis:

THE UNBURNED STONE.	
Lime.....	46.3
Oxide of iron.....	0.7
Silica, quartz, sand and clay.....	15.0
Carbonic acid and water.....	37.6
Total.....	99.6

THE BURNED STONE.	
Lime.....	78.29
Oxide of iron.....	trace
Silica.....	38.20
Alumina.....	1.80
Quartz sand.....	1.71
Total.....	100

At Port Said, the terminus of the Suez canal, the concrete was made of the Teil cement mixed with beach sand. This was formed into blocks, which were exposed for several weeks to the action of the air, before being laid in their places.

W. G. HODSON.

(To be Continued.)

Amador County Mines.

[From Our Traveling Correspondent.]

In Amador county the mining interest seems to be increasing. While the larger mines are working about as usual with few exceptions, smaller companies are in most cases increasing their capacities and finding some paying ore.

News concerning some of the larger mines is easy of access, especially those which happen to be conveniently located, while others of vastly more importance are seldom, if ever, mentioned.

This will continue to be true so long as the present relations between managers and weak stockholders exist.

Intelligence concerning some of the smaller

claims will perhaps convey a better idea of the general outlook than even a detailed repetition of news concerning a few of the larger ones only.

At Jackson

The Zeils had recently been sinking 250 feet. The outlook in the drifts is fair. Of course nothing definite can be learned from the extension of the shaft until the vein is tapped.

The Amador has also been sinking. At this claim there are three shafts. Work is progressing finely, with a favorable outlook.

Reed & Askey are erecting a ten-stamp mill in place of the five-stamp mill formerly used. This mill will be run by a large wheel placed in the center of the channel.

Much interest is manifested in the Trip mine, on the Mokelumne, near Big Bar bridge. The quartz ledge is about 12 feet wide, and looks as though it would pay well for these times. None of the ore has yet been crushed. The company is building a ten-stamp mill, which will be run by water taken from the river not more than 1000 feet above. A tunnel is being run in, raising from the end, to connect with the shaft, which is now down about 80 feet. The tunnel will be about 300 feet long.

Extensive improvements have recently been made at the Kennedy, and the outlook is good.

The Live-Oak,

A small mine, owned by Thomas & Parker, is one of those few quartz mines which has furnished its own capital. The owners began about three years ago and have made the mine pay its own way from the first. Their mill and pump are run with a four foot wheel, which requires but 10 inches of water with a pressure of 200 feet. They are now down about 175 feet. The shaft inclines to the southeast about 30 degrees from perpendicular, with but little variation. With a three-inch Jack Head Garrett pump worked only about six hours in the 24, the water is kept out. This pump is connected with the water-wheel by means of a wire rope, running over pulleys. The mill is about 150 feet from the shaft below. They are at present drifting. The lead has been from four to five feet wide. In the bottom drift it is 18 to 20 inches wide, while at the bottom of the dump, 12 feet below, it is about four feet wide. This ore averages about \$10 to the ton, including sulphurets. A second shaft has been sunk, 40 feet from the first, where a new lead has been tapped, which pays in the neighborhood of \$75 per ton. They will tap the second from the first at 120 feet, and work from the first. The second shaft is now down 80 feet only.

Mr. Thomas has spent most of his life in the mining business, and he says this is the most regularly formed lead he has ever seen.

Pine Grove.

McKenzie Bros., at Pine Grove, have been running a Huntington rotary mill with good success that the second mill like the first will soon be in operation. They are working large veins of low-grade ore.

At Volcano, as well as at Pine Grove, the winter water will be utilized to a good advantage.

At Sutter Creek

The Wildman Company have recently been sinking 100 feet. The shaft is now down 600 feet. They have drifted south and are now crosscutting east and west. They have recently discovered ore that they think will pay well.

Mr. Knight, the inventor of Knight's water-wheel, the hydraulic pump, etc., is working a full crew of men on full time. The demand for his wheels is increasing. Three of his pumps are now in use and giving good satisfaction.

Mr. S. D. R. Stewart, eight miles out on Sutter creek, is putting in a six-stamp mill.

At Amador City most of the principal mines in the locality are running about as usual.

Compressing Air.

In riding from Sutter Creek to Amador City, an observing person will notice near Walkmaster & Brinn's planing-mill and ice factory a small building in which machinery is running. While this machinery, being in sight of no mine, appears to be connected with nothing beyond the building, a stranger will be somewhat surprised on investigating to learn that a Knight water-wheel is here used to compress air. This is only a six-foot wheel and develops a hundred-horse power. This compressed air is piped to the South Spring Hill mine, where it is used in the mine to propel four rock drills. The mine is not less than half a mile away from the compressor. This water is again used for running a stamp-mill and hoisting works.

At the Gravel

They are about to change from steam-power to water. They are putting in a 15-inch, extra heavy, steel pipe. This pipe leads from a large reservoir 1½ miles away, with a fall of 428 feet to the mile. This reservoir is 30 feet deep in the deepest place, and will, no doubt, keep in store a large quantity of water, which will be supplied by the Blue Lake Water Co.

The shaft at this mine is down 1000 feet. It has a double track on a uniform grade, inclining about 65°. The hoisting is now done with steam. There is a drift at 200 feet, north 126 feet. The ledge here is 35 feet wide. They are now stopping it. At this point there is communication with the south shaft. There are also communications at 300 feet, 600 feet and 700 feet. There is a drift north at 500 feet, 175

feet. They are now raising in this 500-foot drift with fine prospects. A straight track leads from this shaft to this mill, a distance of 1000 feet, with sufficient grade to allow the loaded car to draw the empty car up. This company runs a 20-stamp mill. The ore at present pays \$5 to \$8 per ton, including sulphates.

Mr. Cull, the superintendent, tells us that the bonds are all cleared, that the company owns 160 acres of the surrounding land with both an agricultural and a mining claim, and has 3000 feet of claim under control.

Drytown.

At the Cosmopolitan mine the shaft is now down 550 feet. The outlook is good. They have 400 feet of crosscuts and drifts. This is practically a new mine, owned by a Boston company which has recently erected new works.

At Plymouth

The New London has been making some extensive repairs. At the Plymouth Consolidated they are hoisting out this water. The people of this vicinity are anxiously awaiting the time when work will be resumed in their mine.

D.

Interesting and Unusual Association of California Minerals.

[Written for the Press by HENRY G. HANKS.]

During a recent visit to Plumas county, the attention of the writer was called by Mr. J. A. Edman to a heavy, dark-colored mineral, sparkling with light, reflected from brilliant faces of minute black crystals. Were it not for the microscope the beauty of these forms could not be known. A chemical and microscopic examination of this rare specimen showed the crystals to be magnetite, imbedded in a matrix of hematite.

The following are the reactions obtained, and the properties of the mineral: Color, imperfect red; specific gravity, 4.4; hardness, 5; streak, blood red; luster, almost metallic when held in certain lights. Easily decomposed by boiling hydrochloric acid, leaving a residue of silica. Attracts the magnet strongly, but does not possess polarity. A mechanical analysis gave the following result:

Magnetite.....	40.1
Hematite.....	36.9
Silica and a little water.....	23.0

Total.....100.0

While separating the magnetic portion, much difficulty was experienced, when the pulverized mineral was dry, because the magnetic particles lifted mechanically those which were not; but perfect success was the result of a second attempt, made in the presence of a considerable quantity of water. By frequent repetitions the magnetite was wholly separated.

A microscopic examination showed the crystals to be perfect octahedrons varying in size from 0.004 to 0.025 inches. The faces were reflective and brilliant. The magnetic portion was found to consist wholly of these crystals, many unbroken, although the pulverized mineral had been passed through a 40 mesh sieve. These very interesting minerals occur in a stratum or vein of slate lying parallel with and distant about 300 feet from the Diadem gold mine. The slate is the west country, is 60 feet wide and also parallel with the strike of the mineral vein.

The slate also contains magnetite in minute octahedrons. The mineral stratum containing the hematite is irregular, varying in width from four inches to two feet. When it widens, quartz and specular iron occur with the hematite and magnetite.

"Blind Leaders."

[The following incisive letter was accidentally mislaid, which must account for the delay in publication.—Eds. Press.]

EDITORS PRESS:—It would seem, from letters and extracts in the MINING AND SCIENTIFIC PRESS, that metaphysical discussions are not out of place in that valuable journal; although, as those I have observed are conducted mainly on the *ipse dixit* system of argument—the only one, by the way, which admits of the conclusions arrived at—they do not, perhaps, deserve serious notice. However, if you deem the following remarks from a workingman who pretends to no special qualifications for the task, worthy of the honor, I shall be thankful for their insertion in your columns.

It is, doubtless, a little hard on professors of physical science, that conclusions deduced after long and laborious investigation should be objected to, simply because they happen to conflict with the religious belief which is the chief safeguard of millions of the unfortunate and the helpless of humanity, against despair and its terrible consequences, not to speak of its restraining effect as regards crime; but when we remember how little is really proved as a foundation for their stupendous superstructure of speculation, and how widely these same professors differ among themselves, while diametrically opposed to others of at least equal eminence, we may, I think, reasonably be excused from assuming the awful responsibility of disseminating or even believing in such doctrines. Besides, when we see an exponent, like Mr. Huxley, of certain theories deliberately descend to the use of the most egregious fallacies, to insult all that his fellow-men, including the most brilliant intellects of the human race, hold most sacred, we must naturally conclude that

he is not a scientist, but simply an unprincipled sophist; though, certainly, among educated men, a very harmless one indeed. Take for instance that remarkable extract from his works appearing in a late number of the Press, where he claims, in effect, that no scientist would expect belief for a theory based on anything so ridiculously incredible as certain of the miracles recorded in the New Testament. Now it should be superfluous to point out that these latter form merely a question of historical fact, testified to by eye-witnesses, many of whom forfeited their lives to prove their truth—surely verification enough for the ordinary common sense of mankind, as the event has proved, however "immoral" the belief may seem to whatever does duty for a conscience with Mr. Huxley; and any scientific theory admitting of proof equally cogent may be regarded as settled for all time.

Perhaps, if men like Mr. Huxley were to apply themselves, for a time, to elementary studies in logic, and in the exact sciences, they would realize what is meant by proof of a theory. They might also learn of a more advanced stage—if their mental caliber enabled them to reach it—something wherewith to tone down the "big head" with which they seem afflicted. They might realize the narrow limits of human knowledge, which fails to penetrate to the essence even of what seems the creation of the mind itself, to say nothing of external things; and which, in its widest and most successful expansion is a knowledge of the relative only and not of the absolute, even in those same so-called exact sciences, those sciences

Washington Territory Coal.

The Tacoma Globe says: Although only now in its infancy, the mineral prospects of Washington Territory have begun to attract the attention of numerous capitalists, and men who consider that the most important mineral deposits had been discovered and had settled down with a goodly "pile," have emerged from their retirement to investigate the boundless resources of this hitherto unheard-of corner of the Republic. The liveliness of the real estate market will, without doubt, occupy the attention of a majority of investors for a considerable time to come yet; as the country fills up the attention of moneyed men will turn to other sources, and every indication goes to show that with the introduction of smelters and enlarged facilities for the output of coal, this Territory will rank among the first mining districts of the world. The reason Washington Territory differs so materially from other States and Territories is that mineral deposits are universal throughout its entire length and breadth. So far as the reports of the numerous prospectors which daily arrive in the city are concerned, indications of every kind of mineral, from the most precious metals to those more common, are found everywhere.

The value of coal as a fuel, its impurities excluded, depends upon its density, the amount of moisture present, and the amount of oxygen

man mines of King county, is composed of the following parts:

	Per cent.
Water.....	4.17
Fixed carbon.....	41.35
Gas.....	39.25
Ash.....	13.04
Sulphur.....	1.40
Total.....	100.00

Gas-Firing or Making Acid.

In concluding the series of articles on concentration of sulphuric acid, condensed from Mr. Adams' paper, we give a cut which he says shows the best practice which is admitted to be by direct firing over the tops of the pans. The adoption of gas-firing gives uniform heats without necessary waste, and reduces the wear and tear to a minimum.

Objections are raised to this type of plant, on the ground that a certain definite percentage of monohydrated acid is necessarily lost in the current of intensely heated and rapidly moving flame products and air thrown over the surface. This surely need not occur where, by gas-firing, the products of complete combustion are quietly and evenly held in proximity to the upper surface of the pane until saturation takes place. By this method of firing it will be seen that the outlets for the vapors can be controlled absolutely, up to any definite point of saturation.

Such regulation is not as difficult as it looks

Storage Batteries on Street Cars.

The Sacramento Record-Union says: Yesterday was a great day for Sacramento, as it saw the successful introduction of electricity as the motive-power for propelling street cars. Ever since a few enterprising and energetic business men entered upon the construction of a street railway on which electric cars were to be used, the cry has been heard on all sides that it never would be a success, and everything possible has been done by some people to belittle the efforts of the managers and throw cold water on the enterprise. Yesterday the officers and promoters of the scheme had their day of victory and received a perfect ovation from the populace as they passed through J street on their elegant car. It was the occasion of the trial trip of the first car, and it proved a success in every particular.

The car is propelled by two electric motors of four-horse power each, capable of working up to eight-horse power each for a short time. The motors are actuated by electricity stored in 80 cells of the Electric Accumulator Company's make (type "23"), which are carried under the seats of the car. These cells are run under the seats from the end of the car upon trays, and make the connection of the machinery of the car automatically.

The invited guests were assembled at the corner of Fourth and J streets, and had but a few moments to wait for the car, which started from the end of the line near the Southern Pacific passenger depot. As it came around the corner of Third street and turned into J, a great shout went up from the hundreds of people who were collected along the sidewalks on both sides of the latter thoroughfare. Stopping at the corner of Fourth, the favored individuals who had invitations were taken on board, and the car moved on up J street. The electrician, Mr. Wright, stood on the front platform with his hand on the little lever by which the car is started and stopped and its speed regulated. By his side stood L. L. Lewis, while Edwin K. Aleip occupied the rear platform. These gentlemen were repeatedly cheered as the car passed along, and the crowds of citizens were wildly enthusiastic over the evident success of the enterprise. Handkerchiefs waved from all the balconies and the street had a gala-day appearance. The people were happy, and those who predicted failure were dumb.

Those on the car were delighted. Stops and starts were made without the least jerk or jar, and the car ran with less noise than the ordinary horse-car. At the street crossings the electrician sounded the gong by simply pressing an electric button with his foot.

The car proceeded on its way, going down Eleventh to L and up L to Fifteenth, to M, to the corner of Twenty-eighth street. The late rains had put the streets in a terrible condition, and as no car had ever been run over the track, some difficulty was anticipated, but none was experienced.

The return trip was made without the slightest hitch. The car is not turned round in order to run back. The lever is simply removed from one platform to the other, the headlight changed to the other end, and the action reversed. Most of the trip was made at a low rate of speed, owing to the condition of the track, but coming down J street the car ran at the rate of 15 miles an hour, making a block in 20 seconds.

At 7:30 o'clock in the evening the car was brought out again and made four trips up and down J street as far as Eleventh, carrying the wives and families of the directors of the road. The appearance of the car at night was much more striking and attractive than in the daytime. It was brilliantly lighted with electricity, and the electric headlight seemed more powerful than that of a locomotive. The people on the streets were delighted and gave expression to their joy in frequent cheers. The rate of speed at night was greater than during the trial trip, and everything worked perfectly.

The Utah sulphur smelter is rebuilt at the mines, but the refining and subliming works will be built at Salt Lake when the present legal complications are terminated.

GERONIMO PAPINA, a miner employed at the Yuba mine, Pioche, Nevada, was killed on Wednesday last by falling from the bucket in the shaft.

SACRAMENTO has a street railroad on which the cars are moved by electricity in storage batteries. A successful trial was made this week.

U. S. SURVEYOR-GENERAL HAMMOND has appointed Charles H. Morgan a United States Deputy Mineral Surveyor for California.

OREGON people are talking of establishing a State Mining Bureau.



which constitute the fulcrum whereon rests the lever of modern progress. How many infidels can be counted on the roll of distinguished mathematicians? How many even among eminent metaphysicians, whose studies, while they relate directly to the subject at issue, afford them the widest latitude for speculation? Intellectuals successfully trained in those sciences generally search only after truth and know at least the nature of proof. Faithfully yours,
Austin, Nev., Sept. 26, 1888. DIOGER.

THICKNESS OF THE LICK LENS.—Prof. Burnham furnishes the following information concerning the lenses of the Lick telescope: The following are the radii of curves of the two lenses composing the 36-inch object-glass: R. (I), 259.52 inches; R. (II), 259.52 inches; R. (III), 239.59 inches; R. (IV), 40,000 inches. The distance between the two lenses, (surfaces II and III) is 6½ inches; surfaces III and IV, as you will see, are concave, the latter being practically a plane surface. The thickness of the crown (concave) lens in the center is about 1.7 inches, and of the other about three-fourths inch.

A \$20-PIECE.—In the U. S. assay office, N. Y., the gold used in the assay department for testing is absolutely pure, being 1000 fine, and is usually run into long, thin strips that look like so much tape or ribbon. "People often ask me," said a gentleman in this department, "how much gold there is in a \$20 gold piece. There is exactly \$20 in a \$20 gold piece, the alloy used being in excess of this valuation."

A PRACTICAL FIRM.—Wells, Fargo & Co. are making arrangements for establishing a dining-room for their employees on the top story of their new building on Mission street, with the object of keeping young men and boys in their service from the saloons, to which they are attracted by the free lunch.

present. For instance, the oxygen helps, and by the aid of hydrogen produces water and waste coal. Water being an incombustible material, it absorbs the heat produced by the ignition of the coal. If there is much ash it is liable that a slag will be formed, and the amount of heat used in sustaining the slag is also lost. Anthracite coal is the best fuel to produce a high heat, with semi-anthracite or steam coal ranking next. The latter produces a considerable flame and very little smoke, which makes it a superior article for the production of gas. The best kind of coke is made from bituminous coal, because of the large percentage of volatile hydrocarbons therein contained, which disperse easily when exposed to heat. The more oxygen the less carbon and combustible gases, and the more carbon contained in the coal the harder it is to ignite. All the above-named coals are found from the Cascades west to the Pacific. In order to show their superior quality, the following analysis made by Mr. Bethune is given of some semi-anthracite samples from the Conner claim, situated on Skagit river, which promises to be a very important mine:

	Per cent.
Moisture.....	3.73
Fixed carbon.....	71.12
Volatile combustible matter.....	20.67
Ash.....	4.36
Sulphur.....	.12
Total.....	100.00

In this county, and but 12 miles from Tacoma, is a bituminous coal-field which promises to be rich property. An analysis of some samples shows the following results:

	Per cent.
Water.....	3.62
Volatile gas.....	58.90
Fixed carbon.....	34.50
Ash.....	2.95
Sulphur.....	.02
Total.....	100.00

A sample of lignite or wood coal from the Gil-

at first glance, and it offers an absolute degree of heat at all points in the line of pan-surfaces, and at all times alike, without excess of air currents. A failure by reason of absence of practical skill in application should not condemn a process of so great promise.

The employment of superheated steam, favorably operated in many of the Continental factories, is practically an unknown process in this country. Under proper conditions, there is much to be said in its favor, and another decade may give us examples worthy of mention.

CALIFORNIA AND ALASKA.—Fred Searle, writing from Alaska to the Nevada Transcript, says that whatever may be claimed for the mineral wealth of Alaska, it certainly does not afford as good a field for the prospector as does California to-day. So far as can now be ascertained, large capital will be required to place the mines there on a paying basis; and the country is so densely wooded, so covered with undergrowth, so steep and rocky, that searching for mines on the mountains is almost impracticable. Most of the prospecting is done in the canyons and where the streams have exposed the ledges.

SLATE CREEK.—A correspondent writes us from Prescott, Arizona, that the mines on Slate creek are looking very well, but the miners are in great need of copper reduction works similar to those of the Argo, at Denver. There is plenty of good copper ore in the district, but at present they have to pay about \$34 per ton for shipping and treatment, so it takes good ore to pay expenses.

MINERS in the Bonanza mine, Tuolumne county, recently took out over \$5000 in one day from a pocket.

The Eureka Con. mine has sent 60 tons of lead to the Selby smelting works.



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SAN FRANCISCO

Saturday Morning, Dec. 1, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Mineral Surveyors; An Incline Railway, 357. Passing Events; Gold Discoveries; Silicon; Electric Power in Mining; Something About Elevators, 360. The Davis Commission, 361.

ILLUSTRATIONS.—View of Upper Portion of the Incline Railway, 357. System of Direct Firing Over Tops of Pans, 359. Figs. 1 and 2.—Lookout Mountain Railway in Plan and Profile; Henriksen's Safety Device for Elevators, 361.

CORRESPONDENCE.—Concrete; Amador County Mines; Interesting and Unusual Association of California Minerals; "Blind Leaders," 359.

MISCELLANEOUS.—Washington Territory Coal; Gas-Firing or Making Acid; Storage Batteries on Street Cars, 359. Curious Minerals of Utah, 363.

MECHANICAL PROGRESS.—Slow Progress of Electric Lighting in England; Making Steel Tubes from Solid Rods; Cores in Heavy Castings; Riveting Stovepipe; Honor Your Work, 362.

SCIENTIFIC PROGRESS.—The Petrified Forest of Arizona; Liquid Carbonic Acid; Electrical Glass-Breakers; Sense of Smell in Dogs; The Earth's Cloud Belts; A New Alloy, 362.

USEFUL INFORMATION.—Stings of Bees—Why Bees and Wasps Sting; Romping Swallows; Bakers' Profits; Horn-Boring Insects; A New Scheme; Home-Made Ice; To Clean Oil Paintings; Restoring Molded Picture Frames; Dying Out, 363.

GOOD HEALTH.—Sweating in Out; Diphtheria Carried by Turkey; Flea Worms or Black Heads; For Pains in Ear; A Speedy Cure for Whooping Cough; Pneumonia and Microbes, 363.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 364-65.

Business Announcements.

[NEW THIS ISSUE.]

Victor Concentrator—N. W. Spaulding.
Empire Foundry—R. Hoskin, Marysville, Cal.
Practical Assaying School—John T. Evans.
Real Estate—Joseph H. Dorety.
Practical Assayer—H. G. Hanks.
Rock Crushers—Pacific Iron Works.
See Advertising Columns.

Passing Events.

The successful application of electrical power for quartz-milling on a large scale on the Comstock means a good deal for that section as well as for other mining regions. On the Comstock, however, it is specially important, for cheaper milling will admit of the crushing of classes of ores hitherto valueless. The system will, no doubt, be extended.

The sale of the San Bernardino tin property to English capitalists will doubtless be followed by systematic development of the mines. Litigation has for years prevented active work, but now that conflicting interests are settled, and the property is in the hands of capitalists, it will not take long to prove the value of the deposits.

The Southern Pacific Co. has commenced to haul here every week 60 or 70 carloads of coal from Wyoming. It costs \$3 a ton at Rock Springs, and the freight and handling add \$6.75 more. There is not much margin for profit left, and it seems too bad that this coal cannot be laid down here more cheaply, when we need cheap coal so much.

The rich strike on the North Star mine, Amador county, is the topic in local mining circles at present. An account of it is given in our mining summary in another column.

Thanksgiving day was generally celebrated here as a holiday, and the prevailing fine weather gave all an opportunity to enjoy it in the open air, if they so desired.

Gold Discoveries.

There is nothing that will so suddenly and quickly bring a country into notice and settle it up as the discovery of gold. No matter what its agricultural resources or fertility of soil, they will long lie neglected and useless and only be developed by slow degrees. But gold mines bring a population suddenly and quickly, and not only the mines but all the other resources are developed at a bound. We do not need to go out of the boundaries of this State to furnish a notable example. Not many weeks after gold was discovered in California, the eyes of the world and the steps of thousands were turned in this direction, and it was not many months after that a population had gathered which founded a State. It took some years, however, before the agricultural resources were recognized, and it is only to-day that they are being fully realized and developed. It was not until the decadence of the gold supply became apparent that men turned their thoughts to tilling the soil, and then they paid attention mainly to grain. Of late years, however, the capacity of soil and climate with regard to various products has been tested and proved.

The agricultural lands are slowly settled up, but let gold be found and large areas are appropriated in a day. It is true that the mineral lands are as quickly abandoned when worked out, while the agricultural lands are increased in value with time. The gold is exhausted and not reproduced, while the agricultural products are harvested yearly.

But as an incentive to rapid settlement of vacant lands or new regions, nothing can equal the discovery of gold. When Hargraves, going from California, and recognizing the same features, found the gold in Australia in 1851, he inaugurated the settlement of an immense country. Individual industry and commercial enterprise were encouraged, and an immigration started which resulted in founding the splendid colonies now existing. Without this incentive of gold, those vast areas would not have been settled in a hundred years, laboring as they did generally under the stigma attached to penal settlements. Emigrants were even assisted by the mother country to go to the colony. When gold was found, however, the people went there by thousands.

It has been found in other colonies also, and with about the same result. In a report to the Legislative Council appointed to consider the various claims for the discovery of gold in Victoria (published in March, 1854,) occurs the following paragraph:

"The discovery of the Victoria gold-fields has converted a remote dependency into a country of world-wide fame; it has attracted a population extraordinary in number with unprecedented rapidity; it has enhanced the value of property to an enormous extent; it has made this the richest country in the world; and in less than three years it has done for this colony the work of an age, and made its impulses felt in the most distant parts of the world."

Silicon.

We recently received several samples of silicon from a claim located not long since by Ohas. T. Washeim, near White Plains, Churchill county, Nev., and close to the railroad. There is an abundance of this material, which can be quarried at small expense, and all contained in a 20-acre claim. The material is in a regularly stratified ledge, running northeast and southwest. There are several distinct strata, each carrying material of a certain quality of fineness. The outer stratum westward is exceedingly fine; the next is coarser, and the next coarser still. There are other strata of greater degrees of coarseness.

The best is a chalky-looking piece fine enough to be useful in the manufacture of electro-silicon—silver polish. Another piece of the same material has about 70 per cent silicate and would be useful for soap manufacture or foundry sand for fine work. The finest is identically the same as was recently shipped to New York from Nevada, for the Electro-Silicon Company. The actual expense of laying this down in San Francisco would not exceed \$11 per ton for mining, loading and freight charges by carloads. More or less of this substance is found in different localities, but some of the samples sent us are quite fine in character.

Mineral Surveyors.

The requirements in other countries are very different from what they are here in the matter of qualifications of official mineral surveyors. Here the U. S. Deputy Mineral Surveyors are appointed by the Surveyors-General of the different States without any official examination unless they choose to make it. The only judge of their qualifications is the man who appoints them. Under the conditions existing in this country, little knowledge of mining matters is expected of them, and they pick that up as they go along, the main requirement being that they understand how to work with a transit and to work up their field notes. There is no board of examiners to find out whether a man is fully qualified in all the branches of his profession, and those who employ them must trust more to personal knowledge or reputation of the individual than to any general merit implied by the title of U. S. Deputy Mineral Surveyor. Some men who have held the appointment for a long time have acquired experience which is valuable to those who employ them, and are kept busy in consequence. Others have very little to do.

To show how careful they are in some other countries in conferring official authority on mining surveyors, we quote the "preliminary conditions" of the examination for mining surveyors in the Colony of Victoria:

Every candidate must have previously obtained a certificate as contract or authorized land surveyor from the board of examiners appointed in connection with the Department of Lands and Survey in Victoria.

He must also have served for not less than six months under some competent mining surveyor or engineer, or mining manager, in the conduct of mining surveys or actual mining operations.

A candidate whose application shall have been approved as having complied with the above conditions will be examined, and will be required to pass in each of the six following subjects:

(1) Mining Surveying.—Connection and reduction of bearings to datum of surface survey; survey of vertical and inclined shafts, drives, and workings; survey of mineral veins and lodes, leads and drifts.

(2) Leveling.—Practice of surface and underground leveling; leveling by vertical angles, plotting sections.

(3) Mensuration of Earthwork.

(4) Practical Mining.—Construction of shafts, chambers, and tunnels in rock and drift; timbering, drainage and ventilation of mines; general principles of the strength of timber in framings; construction in rough carpentry.

(5) Hydraulio Engineering.—Measurement and estimation of sources of water supply, dimensions, and discharge of pipes and channels; construction of reservoir embankments, weirs, and aqueducts.

(6) Lithological structure of the principal rock formations as they occur in Victoria, modes of occurrence of gold and other valuable minerals.

It will be seen by this that the mineral surveyors in the Colonies have different work expected of them from what is the case here. It is mainly surface surveying that our deputies have to perform, and a knowledge of surveying and of the general mining laws is all that is expected. It must be remembered that here the mines belong to the people who have located or purchased them, while abroad they belong to the Crown. This in itself would naturally make a difference in the duties of the official surveyors.

PAYING WELL.—The Broken Hill Proprietary Company of Australia is turning out an average of \$100,000 per week in coin. The company is paying a regular monthly dividend of \$15 per share; the present selling price of the shares of this company is \$1400. This is the company that Mr. Patton left the Comstock to take charge of.

AT MELBOURNE.—We sent about 500 copies of the MINING AND SCIENTIFIC PRESS to the great exhibition at Melbourne, and the resident manager of Parke & Lacey placed them with the mining machinery exhibit of that firm. He writes that the mining men there appreciate the paper, and regrets that more copies were not furnished, as they were in demand.

Something About Elevators.

NUMBER 5.

Now that elevators have become a positive necessity in all the well-regulated and properly equipped hotels, business blocks, factories, stores and other buildings of like importance, where the questions of rapid transit and convenience are of serious consideration and importance, it becomes the bounden duty of all persons owning and occupying such buildings to provide and apply to their elevators the simplest and most effective safety attachment they can find, in order to protect all persons who are obliged to use their elevators against all possibility of injury in case of accidents.

Such safety attachments, in order to be positive and reliable, should be constructed with as few working parts as possible and entirely free from springs, triggers, latches, pawls and unreliable parts requiring almost constant care and attention to prevent their becoming stiff and gummed up or otherwise deranged and consequently useless when most needed.

They should furthermore be entirely automatic in their action and arranged so as to operate instantaneously and effectively whenever the descent of the cage or platform is perceptibly increased beyond the usual speed either by reason of the breaking of the main cables, counterweight or drum ropes, ram-stem, winding drums, or any other accident which is likely to happen to the most perfect of machinery.

Every elevator-builder has a safety device of some kind that he applies to the cages which he builds, and as a matter of course unhesitatingly recommends it as the best and only reliable one in use. In order to prove these assertions a pretense is made at testing as soon as the elevator is finished and the "safety" is in order. These tests almost always consist in forming a large loop of slack cable tied with a piece of rope, and when the cage is raised to the next floor the hind rope is cut so as to allow the cage to drop suddenly. The new "safety" nearly always stops the cage. The purchaser believes that the "safety" is reliable and the builder receives his money and is happy.

These tests illustrate what would be the result in an accident caused by a broken cable, but as not one elevator accident out of 50 is caused by the breaking of a main cable, the reliability of tests of this kind is self-evident. Nearly all the safety attachments now in use upon elevators are based and built upon this principle and theory.

California ingenuity is again entitled to credit in discovering a safety device for elevators which is claimed to fill all the requirements of a first-class attachment, herein enumerated, and by several actual tests has proven itself to be a "safety" in fact as well as in name. We refer to the automatic safety clutch, patented by B. E. Henriksen, the architect, of 218 Post street.

As will be seen by the sketch on the opposite page, this safety clutch consists of two cams or eccentrics provided with sharp teeth on the outer surface, mounted on a steel shaft, journaled into a solid angle brace or bracket, securely bolted to the frame of the cage, and operated by means of an upright lever, surmounted by a rubber roller which is made to run over a series of bosses or projections applied to the guide-posts. Two sets of these clutches are attached to every cage. When the cage descends at the regular speed the rubber rollers pass over the projections without throwing out the levers.

Just as soon, however, as the speed of the descending cage is perceptibly increased, either by reason of the breaking of the cable—counterweight ropes, drums or any other part of the hoisting machinery, the impact of the rollers against the projections causes them to rebound, thereby throwing out the levers and bringing the cams or eccentrics in contact with the guide-posts and instantaneously stopping the falling cage. The principal features of this safety clutch consist in the simplicity and strength of its construction, as well as in its reliability and instantaneous action. When applied to a cage it is in full view of the operator, but does not require any attention. As there are no springs, triggers, pawls, governors or other unreliable mechanism to become broken, stiff, gummed up or otherwise deranged, it is ever ready for instant service.

Another very important feature possessed by this safety clutch is the possibility of applying it to any kind of cage, old or new, without in-

terfering with the safety already applied thereto, and in this manner making assurance doubly sure. This clutch being entirely automatic in its action and operated by the speed of the cage, its action is positive; the greater the speed the quicker the action; the heavier the load upon the cage the tighter the grip of the cams. It also sets itself automatically, and can be adjusted and regulated to any rate of speed, and will operate as readily on an empty as on a heavily-loaded cage.

The following record of actual tests shows that the Henriksen safety clutch has proven itself to be all that the inventor claims, and is worthy of consideration and attention: August 17, 1880.—Elevator in the Johnson building, 120 Sutter street; fall caused by the breaking of main drum; six passengers in the cage; nobody hurt. September 28, 1880.—Freight elevator in California Furniture Factory, No. 224 Bush street; elevator-man and load of costly furniture on platform; main pinion on main shaft broke; no damage of any kind. June 25, 1881.—Hass Bros., wholesale grocers, north-west corner Front and California; drum broke in basement; porter and load of freight on platform; no damage. August 15, 1881.—Sloan & Co., wholesale carpet store, No. 525 Market street; the manager and two ladies descending from top floor; the drum ropes broke; nobody injured. May 7, 1882.—Elevator in New City Hall, S. F.; two men and two ladies in the cage; main hoisting-wheel broke; no person injured. September 14, 1885.—Elevator in Mechanics' Pavilion on Larkin street; main driving-wheel of engine broke; 20 to 25 persons on the platform; nobody hurt. S.

THE skeleton of a miner named James Robinson was found this week in his cabin in Lincoln Gulch, Deer Lodge county, Montana. All the flesh had been eaten from the bones by mountain lions. It is supposed he took an overdose of opium, and while in an unconscious condition the wild animals entered his cabin and killed him.

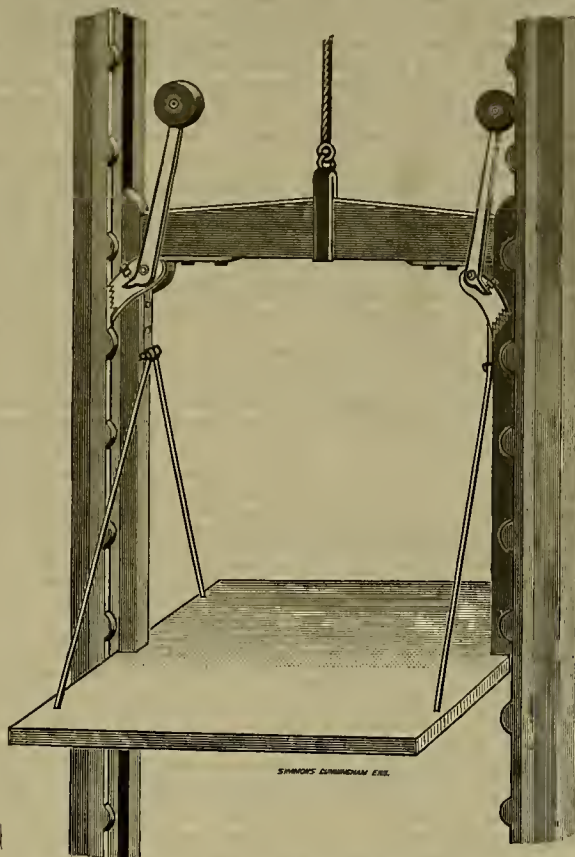
THE Ohio petroleum-field is now yielding 40,000 barrels per day, nearly all of which is piped to Chicago and used as fuel. This is what shuts down the coal mines.

DR. W. T. JOHNSON of the State Mining Bureau has analyzed the pottery clay found in

The Debris Commission.

Major T. H. Hanbury having arrived from his station in Oregon, the Debris Commission held its first meeting on Monday in the office of Mayor Heuer, with Major W. H. H. Benyard

three members of the Commission has been divided so that now will go over the documents already received, and each of the others is to take half of what is to come. All of the members of the Commission are officers of the U. S. Engineer corps, familiar with the work of im-



HENRIKSEN'S SAFETY DEVICE FOR ELEVATORS.

as chairman. The headquarters are in the Flood building, corner of Fourth and Market streets. They have decided to hear every argument pro and con on the hydraulicking dispute. They will hear miners and farmers, and will gather all the testimony obtainable as to how

provement of rivers and harbors, and bring to their task much technical knowledge and experience in this direction. It is, however, regretted by many miners that some engineer familiar with hydraulic mining was not chosen to act as one of the Commission. Still the gen-

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING NOV. 20, 1888.

- 393,222.—SPRING CLASP—H. Elieau, S. F.
- 393,223.—CARTRIDGE EXTRACTOR—F. E. Elliot, Miles, W. T.
- 393,102.—REGISTER FOR WATER-METERS—F. T. Gilbert, Walla Walla, W. T.
- 393,234.—TWO-WHEELED VEHICLE—Wm. Holloway, Gilroy, Cal.
- 393,309.—STATION INDICATOR—B. W. Lyon, S. F.
- 393,116.—BALING PRESS—W. P. Martyn, Harrisburg, Ogn.
- 393,237.—STATION INDICATOR—J. I. Irving, S. F.
- 393,178.—FIREPLACE—R. Savage, S. F.
- 393,197.—PRUNING SHEARS—Woolley & Behmer, Santa Rosa, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TWO-WHEELED VEHICLE.—Wm. Holloway, Gilroy, No. 393,234. Dated Nov. 20, 1888. This is one of those vehicles known as carts, and the object of the improvement is to prevent the up-and-down motion due to the joggling of the horse. The rear section of the shaft and the spring are clipped solidly to the axle. The forward section of the shaft is hinged to the rear in a peculiar manner, and a spring is interposed at this connection in such a way that the joggling movement of the horse is not imparted to the vehicle.

FIREPLACE.—Richard Savage, S. F. No. 393,178. Dated Nov. 20, 1888. In this invention much of the heat which goes to waste in fireplaces of ordinary construction is economized by means of an air chamber at the rear through and around which the products of combustion are carried by suitable flues and the air thus heated is delivered into the room through ornamental apertures in the sides of the grate-frame. The back of the fireplace is formed with pins or lugs cast upon it so as to project rearwardly into the heating space to increase its efficiency. An opening is made in the back of the grate leading to the ash-pit, and suitable flues and dampers to cause a draft into the chimney, which prevents the dust from being blown into the room. The grate and basket are made in sections, so that they may be easily taken down for inspection. Flues may lead from the hot-air space to other rooms, with registers by which the admission of heat to these rooms is controlled. Great economy of fuel results from this construction.

STATION INDICATOR.—Benjamin W. Lyon, assignor to Pacific Indicator Co., S. F. No. 393,309. Dated Nov. 20, 1888. This is an improvement on a similar device patented by the same inventor June 26, 1888. In that patent he showed an indicating roller, a series of winding drums with an endless chain or band, a rack pinion and ratchet movement on cylinder, springs and lever, by which the indicator is moved forward at each station. In the present invention he uses a tripping lever and a fixed lug or obstruction upon the road-bed, in combination with a rotary disk, a screw driven from the car-wheel or axle and provided with convolute grooves, together with a lever which engages and operates the indicating mechanism, and a means whereby this lever is caused to engage with a screw so as to be operated thereby until the station is indicated, after which it is disengaged from the screw and returned to the first position to be again operated.

PRUNING SHEARS.—Wm. O. Woolley and Daniel Behmer, Santa Rosa, No. 393,197. Dated Nov. 20, 1888. This invention consists of a semi-circular independent cutting blade, with the central point pivoted to an extension of one of the handles, and the rear end having an anti-friction roller with the other handle, and in combination with this of a rest for the limb or part to be cut, bearing such a relation to the blade and its two fulcrums that when the jaws are closed a knee-lever action is produced, and the power increased toward the finish of the cut.

W. J. COYLE of the firm of Knight & Co. has sold his quarter interest in the foundry and machine shop at Sutter Creek, Amador county.

J. W. WILLIAMSON of Philadelphia is about to found a school for the industrial education of boys with an endowment of \$12,000,000.

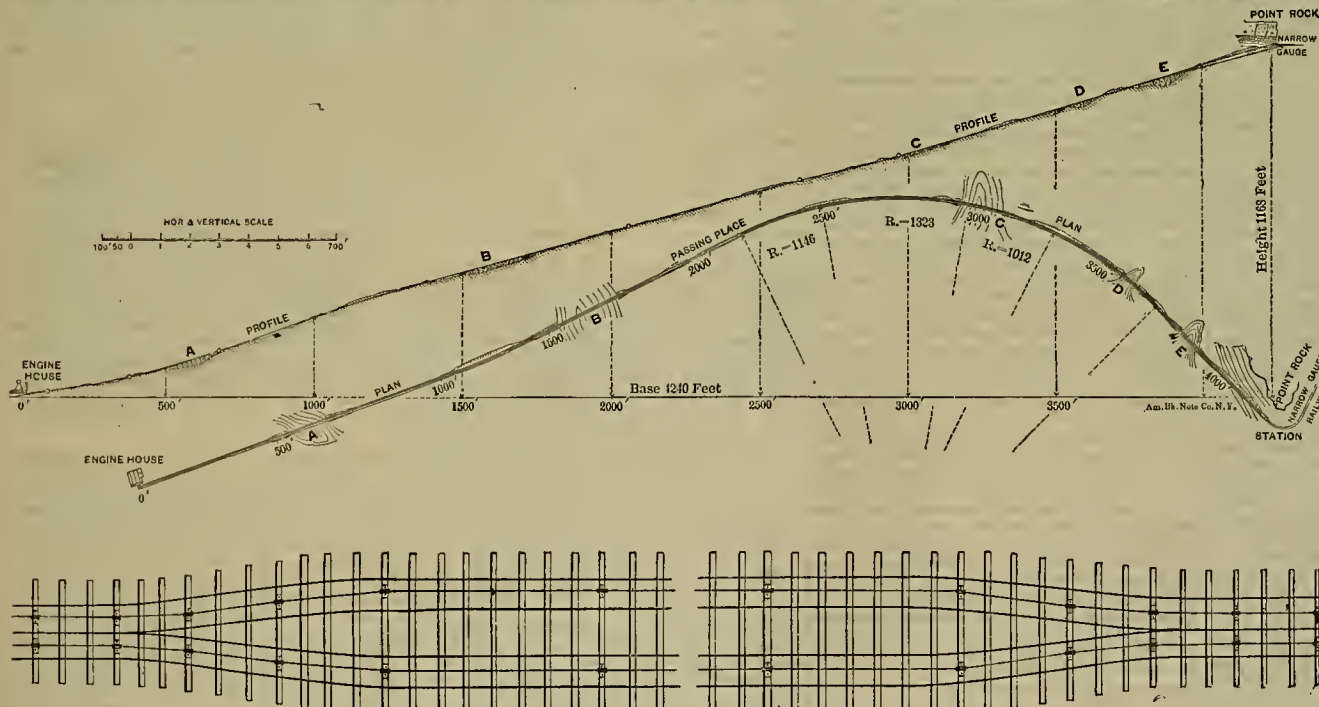


FIG. 1 AND 2.—LOOKOUT MOUNTAIN RAILWAY IN PLAN AND PROFILE.

the mountains near Colton, and pronounces it of excellent quality.

THE volume of water discharged on the Pelton wheels on the Sutro tunnel level is equal to about 200 miner's inches. The electric motors of the test run made 850 revolutions a minute.

THE strike of coal miners in Belgium is spreading. Gendarmes and guards are patrolling the troubled districts.

A \$70,000 cleanup has just been made at the Cherokee mine, in Butte county.

the debris has affected the navigation of the rivers and the bay.

The Commission will send out circulars to all of the leading representatives of the mining element and the anti-debris dwellers in the valleys, and also to the steamboat men and others. Written replies will be requested on all sides, and, if thought best, some oral testimony will be taken. As a report will be made to Congress at its next session, if possible, in time for it to take action, the time in which to receive replies will be limited to 60 days.

The preparatory work to be done by the

tlemen selected, having nothing to do with any business connected with either side of the dispute, will be apt to deal with the question in a manner that will cause their decision to be accepted as beyond criticism.

MECHANICAL PROGRESS.

Slow Progress of Electric Lighting in England.

The Boston *Journal of Commerce* refers as follows to some discussions at a late meeting of one of the English technical societies:

Prof. Farley of London, who has recently made two visits to the United States to inspect the various systems of electric lighting, presented the results of his observations. What astonished him when he reached the United States was the appearance of the electric light everywhere; what mortified him when he returned to England was to see it nowhere—darkness and gloom in the streets of English cities and towns; light in every city and village in the United States, where, according to recent statistics, there were 300,000 arc lights in use, and nearly 3,000,000 incandescent lamps. He thought that the slow progress in electric lighting in England was due to the Act of Parliament passed in 1882, which did not put electric lighting on the same footing as gas illumination. His attributions to this progress in the United States to the go-ahead-iveness of the Americans and to the great advancement which had been made in the United States recently in technical science. In that the Americans had gone ahead of the British. It was not, he thought, from any want of capacity on the part of English inventors that England was so far behind the United States in electric lighting. He claimed that England had produced the best dynamos and the best lamps, yet, with inferior machines, the people of the United States had left England far behind. The Americans were determined to go ahead, to use what came to hand till something better turned up, while John Bull waited to get the best before doing anything. In the United States, men of capital took hold of things and aided in their development, while in England they waited for the inventor to make his invention perfect.

There was a *non-sequitur* in the professor's argument. If England has produced the best dynamo and the best lamp, is it not remarkable that the Yankee does not appropriate them, if he is so eager to get the best? If England has produced the best means for lighting her cities, is it not still more to be wondered at that she sits still and does nothing?

Prof. Prece, the president of the section, said that the inaction of England was not due, in his opinion, to the Act of Parliament, for between 50 and 60 provisional orders had been taken, and under that Act, but it was because the system of electric lighting was not sufficiently advanced to warrant, in the minds of capitalists, the expenditures of money. He, too, like Prof. Farley, had just returned from America, and he had been greatly impressed by the wonderful activity of the people of that country; but he thought it wise on the part of England to wait until electric lighting was better understood, and when the best system was developed, to adopt it. They would know more a year or two hence than they do now.

Another paper was read upon the American system of electric lights as used on the Suez canal, by which vessels could navigate the canal by night, greatly increasing its efficiency.

It was plain, writes the foreign correspondent of a contemporary, from the general admission of all the speakers, that the United States is far ahead of the mother country in electrical apparatus. It is apparent, also, that none of the speakers has comprehended all the factors entering into the question. They must go beyond this Act of Parliament for the establishment of electric lighting companies; nor will the reason given by Prof. Prece suffice—that the Americans are ahead in technical education. I apprehend that the patent laws of the two countries have had something to do with it. In the United States the laws are so democratic, the patent fees so low, that everybody is contriving something new. Invention has become second nature. Some of our greatest men—those who have made their mark on the age—have thought upon the great question of applied mechanical science. Thomas Jefferson took out a patent for a plow; Abraham Lincoln patented an invention for the improvement of canal-boats—a method for getting them over shallow places in rivers. The universality of invention in the United States has come from the needs of a new country—the demand for prime motors, the fingers of steel and hands of iron, to do the work of human muscles. The great inventions of the last half-century have come largely from the United States. At the close of the last century and the beginning of the present, under the stimulus of the inventions of Watt and Arkwright, impelled by the demands of the textile industries, England made a rapid advancement in the construction of labor-saving machinery. Her advance was in machines for manipulation of metals and textiles. In the third decade the United States stepped to the front with the telegraph, and later its application to the fire alarm, and in these later years she has astonished the world by the telephone, phonograph, graphophone, the electric railway and the electric light, first exhibited in Salem, Mass., by Prof. Palmer. The United States has not set the rivers on fire, but she is compelling her mountain streams, instead of idling their time away, to give light and comfort to the people, illuminating street and dwelling, by turning water-wheels, which set dynamos to whirling, creating light, not out of falling water, but by it.

WROUGHT IRON DIRECT FROM THE ORE.—In a German invention the furnace is provided with hollow walls, through which the blast is led before entering the tuyeres, for the purpose of regulating the temperature both of the furnace and the blast. At the same time the hearth is also made immovable. The walls of the hearth are furnished with tuyeres, each of which forms a portion of a hollow sphere, and rests in a spherical bearing in the walls of the hearth, to admit of directing the tuyeres in any required direction. The iron ore is mixed with suitable fluxes and a small quantity of coals, as usual in the production of pig iron, and reduced somewhat above the tuyeres, while the furnace is caused to work cold. The iron thus obtained sinks past the tuyeres without taking up any large amount of carbon, and upon arriving at the hearth it forms a wrought-iron bloom, which may be immediately worked.—*Ex.* In connection with the above, we would say, on authority of the *Pittsburg Post*, that John Norton and John Tate, employees at McKeesport, Pa., have, after much outlay both of money and labor, discovered and thoroughly tested, on a small scale, a process whereby the finest quality of wrought iron is produced direct from the ore, and with very little additional expense, entirely obviating the slow and expensive puddling process now in use. The process has been duly patented, and promises to attract national notice. Numerous offers for the patent have been received by the men.

MAKING STEEL TUBES FROM SOLID RODS.—At a recent meeting of the Physical Society, Berlin, the president, Prof. Da Bois Raymond, gave an account of a communication which had been made by Siemens at the last meeting of the Akademie der Wissenschaft. A steel tube 10 cm. long, with perfectly smooth external and internal surfaces and extremely uniform bore, and whose walls are apparently or perfectly equal thickness at all points, was prepared by the following method, patented by Manns-mann in Bismarck: Two rollers, slightly conical toward their lower ends, are made to rotate in the same direction near each other; a red-hot cylinder of steel is then brought between these cylinders and is at once seized by the rotating cones and is driven upward. But the mass of steel does not emerge at the top as a solid, but in the form of the hollow steel tube which Siemens laid before the meeting. Prof. Neesen gave the following explanation of this striking result: Owing to the properties of the glowing steel, the rotating rollers seize upon only the outer layer of the steel cylinder and force this upward, while at the same time the central parts of the cylinder remain behind. The result is thus exactly the same as is observed in the process of making glass tubes out of glass rods.

CORES IN HEAVY CASTINGS.—When cores run through heavy bodies of iron, the hot liquid raises the fusible element of the sand to such a high temperature that the grains fuse together, so that when the casting cleaner tries to get the core out he finds it almost as hard as the iron. A good thing to prevent this fusing of the sand is to mix some sea-coal or blacking in it, and to give the surface of the cores a good body of black lead, or plumbago blacking. This outside coat of blacking will prevent the liquid iron from eating into the surfaces of the cores and, and the sea coal or blacking mixed in the sand burns away and passes off in the form of gas, leaving a porous body between the grains of sand, which assists in preventing its fusing. In putting rods in such cores as are subjected to high temperature, it is a good plan to coat them with two or three thick coats of flour paste, and dry them in an oven as it is put on; for by doing this the dried paste burns off from the rod and leaves it free to come out of the casting.—*Molders' Journal.*

RIVETING STOVEPIPE.—A recent invention is a machine for riveting stovepipe. In the old way, each of the six or nine rivets in a piece of pipe was drawn and driven separately. By the use of this riveting machine, says the *Chicago Journal of Commerce*, all the rivets are drawn by one drop of the hammer, and all of them are set by one drop of the hammer. One man with this machine can turn out from 600 to 1000 joints of pipe per day. The pipe is formed on a cylinder connected with the riveting machine, and this makes it uniform in size and leaves the lap smooth and free from buckles. There is, we believe, no machine of this description in the market, and it is said the invention will mark a new era in the manufacture of stovepipe. It is easily operated, there is no complicated machinery about it, and it does the work perfectly.

HONOR YOUR WORK.—A workman who honors his work is pretty sure to have his work honor him. The man who is constantly striving to excel, whose aim is to perform every task in a superior manner and to make his services of the greatest value possible to his employer, is bound to succeed. This is the class of men all employers are glad to secure. But the class of hands whose only object on entering a shop is to while away time, no matter how, till the whistle blows, are always discontented and the most annoying of fault finders.

IRON FROM ALABAMA.—The steamer *City of Birmingham* recently arrived at Philadelphia with 2000 tons of pig iron, a direct shipment from Birmingham, Ala. This steamer, together with another, now building, is designed especially for this trade.

SCIENTIFIC PROGRESS.

The Petrified Forest of Arizona.

One of the wonders of Arizona is the silicified forest in Apache county in that Territory. This immense forest of petrified trees is regarded as among the most notable curiosities of the world. Petrified wood is quite common in almost all parts of the globe, but nowhere in such immense quantity as in the locality named. This wood is now being worked up into various forms, and sawed and polished by special machinery, for use in decorative art.

The Origin of these Petrifications.

One of the best theories of the origin of these petrifications was recently given in the *Popular Science Monthly*, substantially as follows: The trees were first overthrown and covered with volcanic ashes and tufa. The heated silicified waters, either gushing from natural hot springs, or forced up by the violent volcanic action which felled the trees, percolated through the ashes, cooled on reaching the level of the trees, and thus produced conditions favorable for rapid silicification or petrification.

The moisture in the ashes and tufa may have effected a partial alteration, as also any waters that may have filtered through them, either hot or cold. Under these circumstances decomposition would be assisted and much silica set free. The waters would become charged with this, the silica being held partly in solution, similar to that in liquid glass, the silicate of soda of commerce. The silicious water then slowly penetrated the wood buried in the tufa, and was slowly deposited in the cells of the wood. In this manner the fibers of the wood were replaced by the silica.

The process was evidently a slow one, and the trees, from all appearances, were partly decayed and water-logged when the silicification took place. The jasper and agates generally replaced the cell walls and fibers, and the transparent quartz filled the cells and interstices, especially where the structure was broken down by decay. The cell centers and cavities produced the conditions favorable not only for the deposition of the silica as quartz, but also for the formation of the druse, crystalline cavities of quartz and amethyst that enhance the beauty of the material so much. It is evident, from the rich variety of colors, that the waters held oxides of iron, and perhaps manganese, as well as silica, the red color being caused by hematite, the yellows and browns by limonite, and the black by oxides of manganese.

Mr. Kunz thinks that it is possible also that the ash was deposited partly in water, and thus heated it. There is every indication that the deposit is of considerable depth. Over the entire area the trees lie scattered in all conceivable positions, and in fragments of all sizes, sometimes resembling a pile of cartwheels. A tree 150 feet in length is often found broken up into as many sections of almost uniform length, presenting the appearance of having been sawed asunder for shingle blocks by some prehistoric forester.

Again is found a giant tree broken into countless fragments, ranging in size from a small pebble to a fair-sized houlder. Perfect shaped cubes, ready to be polished and used as paper weights, are also found. These multiplied fractures are the result of alternate heat and cold acting on the water collected in the fissures of the tree.

The highest point in the park is some 200 feet above the surrounding level, and it is here that the buried trees can be seen to the best advantage. Some of them are 150 feet long and 10 inches in diameter, and lie exposed in all conceivable positions. One section of a tree, which has been broken up, measures 8 feet in diameter, 10 feet in length, and weighs several tons. The tree was originally about 200 feet long. Some pieces of the trunks of these trees, which were taken to New York, ranged from 8 inches to 13 feet in diameter, and from 25 to 1000 pounds in weight. The perfect preservation of the trunk is remarkable. The rings are so distinctly visible as to convince even the most incredulous of their organic origin.

Although silicified wood is found in many localities throughout the world, nowhere is it so beautifully colored as at this place. Here are found various shades of yellow, brown and green. Sometimes the colors appear in distinct spots, forming a mottled appearance; then, again, all blend so imperceptibly as to make a much more pleasing and harmonious effect than the decided banding of the agate, where the lines of demarcation between the colors are so distinct as to become obtrusive. The colors above mentioned are often relieved by white, black and gray, and by transparent spaces of brilliant quartz crystals, or, as sometimes occurs, of amethyst. Broken sections of the hollow trunks are often lined with amethyst, quartz and calcite, which add to the variety of color.

Dr. P. H. Dindley of New York microscopically examined some sections of this wood, and finds that part of it at least belongs to the genus *Aracaria*. He says that the *Aracaria excelsa*, the Norfolk island pine of the South Pacific ocean, grows to a height of from 150 to 200 feet. In longitudinal section the lenticular markings of the wood cells near each end are in double rows and contiguous, the markings of one row alternating with those of another, giving the appearance of the beautiful hexagonal markings of this genus. In central portions of the cells

sometimes only one row of markings is seen. Medullary rays were indistinct.

Other portions resembled our red cedar (*Juniperus Virginianus*) when grown in the extreme South. This cell structure of some indicates a growth in a mild and uniform climate, the annual rings being marked only by one, two, three or more slightly smaller hexagonal or rounded cells, not tabular, as is usually the case. The cell walls are nearly uniform in thickness. All the specimens examined showed that the wood originally was undergoing decay before being filled with the various media which afterward solidified. On some of the specimens traces of fungi (*Mycelium*) causing decay were discovered. The beauty of the wood is due to the destructive influences of fungi.

LIQUID CARBONIC ACID.—The manufacture of liquid carbonic acid is now an important industry in Berlin, where, according to *Industries*, a company established for this purpose is making daily over half a ton of this commodity. The acid is sent out in steel bottles, each containing from 17 to 18 pounds, and the price charged is a little under 1s. per pound. The acid contained in a bottle when expanded into gas occupies over 10,000 cubic feet. It is principally used in the manufacture of mineral waters and for beer engines. An important use of carbonic acid was suggested as early as 1879, by Dr. Raydt of Hanover for the raising of wrecks, who demonstrated the possibility of this application by an experiment at Kiel. The apparatus consisted of a steel bottle containing the liquid acid, and a collapsed canvas bag placed over the neck of the bottle. When the whole is submerged, and attached to the object to be raised, a cock is opened, and the liquid in the bottle is allowed to expand into the bag, inflating the latter, and thus causing it to rise. Another application was introduced by Herr Krupp of Essen for compressing liquid steel, and a large plant for the production of liquid carbonic acid has already been at work for some time at this Essen factory.

ELECTRICAL GLASS-BREAKER.—Several glass factories at Pittsburgh are now using electricity for a novel purpose. Heretofore, when it was desired to cut out one of the large cylinders of window glass, a simple but primitive method was used. This consisted of the pulling out from the furnace of a thin shred of glass heated white. This was quickly wrapped round the bottle-shaped end of the cylinder, and it burned through or fractured the glass. A pair of tongs had to be used in this process. By the new method, the glass cylinder is encircled with a fine wire, the extremities of which are put in connection with a small electric battery. It is necessary that the wire adhere closely to the glass. When a current of electricity is passed through the wire, the latter becomes red hot and heats the glass beneath it. Then a single drop of water deposited on the heated place will cause a clean breakage of the glass clear round the path of the wire. Contrary to what takes place with the usual process in the treatment of this fragile material, it is found that the thicker the glass may be, the better the cut.

SENSE OF SMELL IN DOGS.—Careful experiments on the sense of smell in dogs have been made by Geo. J. Romanes, who has communicated the results to the Linnean Society of London. He finds that not only the feet but the whole body of a man exhales a peculiar or individual odor, which a dog can recognize as that of his master amid a crowd of other persons; that the individual quality of this odor can be recognized at great distances to windward, or in calm weather at great distances in any direction; and that even powerful perfumes may not overcome this odor. Yet a single sheet of brown paper, when stepped upon instead of the ground, and afterward removed, was sufficient to prevent Mr. Romanes' dog from following his trail.

THE EARTH'S CLOUD-BELTS.—The researches of M. Teisserenc de Bort show a marked tendency of the earth's cloudiness throughout the year to arrange itself in zones parallel to the equator. A belt of maximum cloudiness may be traced near the equator, two bands of light cloudiness extending from 15 to 35 degrees of latitude north and south, and two zones of greater cloudiness between 45 and 60 degrees, beyond which the sky seems to become clearer toward the poles. These zones have a noticeable tendency to follow the sun in its change of declination, moving northward in spring and southward in fall. The zones of clear sky correspond with regions of high pressure. The distribution of cloudiness is a direct consequence of the course of the wind.

A NEW ALLOY.—A new alloy has been discovered by Herr Reith of Bockenheim, which is said to practically resist the attack of most acid and alkaline solutions. Its composition is as follows: Copper, 15 parts; tin, 2.34 parts; lead, 1.82 parts; antimony, 1 part. This alloy is, therefore, a bronze with the addition of lead and antimony. The inventor claims that it can be very advantageously used in the laboratory to replace vessels or fittings of ebomite, vulcanite, or porcelain.

ENGLISH APPRECIATION.—Sir Wm. Thompson considers Edison's discovery of the phonograph "one of the greatest in the practical application of science ever made."

USEFUL INFORMATION.

Stings of Bees - Why Bees and Wasps Sting.

Nearly every boy and girl, whether living in the country or city, has at some time been stung by either a bee or a wasp. At the time of the sting the pain has so occupied the attention that you did not stop to consider whether the sting was inflicted by a bee or a wasp, nor did you at the time admire the mechanism by which the sting was inflicted. All are aware that the sting is actually painful, and that it is inflicted by the rear or tail end of the insect. Some one has humorously called this the "business-end" of the insect. All should know that a drop of water of ammonia (often called "spirits of hartshorn") applied to the place will usually at once relieve the pain caused by these stings, as well as those of the mosquito. If ammonia is not at hand, a little baking soda, mixed into a thick paste with water, may be applied. In the absence of both of these, apply a plaster of mud. If no application can be made, the pain will soon pass away, and we may then well consider how the wound was inflicted.

Their weapons often serve to protect them from their enemies, but with bees, especially the honey, or hive bees, at the approach of winter, the drones or males are no longer of any use, and are killed off by the stings of the workers to save the stores of honey they would otherwise consume. With many of the wasps their stings are food preservers. The large wasps which make their holes in the ground, and some bees, like the carpenter bees, which cut circular holes in boards or other wood, deposit an egg in one of these holes, place food for the grub that will hatch from this egg to feed upon, and when this grub has made its growth, it goes into the chrysalis state, and in time comes out a perfect bee, or wasp, as it may be. But you will ask, "What has this to do with the sting?" A great deal. If the caterpillar or other insect, intended as food for the young bee or wasp, were dead when stored away, it would decay and be useless. The effect of the poison of the sting is to keep in a semi-torpid existence, alive, but still dormant, and thus preserve the food in a proper condition to be eaten by the grub of the bee or wasp. In this respect we can see that the sting plays a very useful part, but when the sting is employed upon ourselves we fail to see what good end is accomplished. Even when a bee-keeper is doing his best for the comfort and welfare of his bees, they often turn upon and sting him, most needlessly and painfully.—*American Agriculturist.*

ROMPING SWALLOWS.—There are sprightly birds that sometimes seem to have a really good and jolly time. An incident of this kind is referred to as follows in a late number of the *Buffalo Express*: They say man is the only animal that can laugh, but he is far from being the only one that can cut capers and have a good time. There is a colony of swallows that find a roomy home inside a broken cornice on the Noye building, at Washington-street bridge, that was lately observed engaged in what must have been sport. One of them, when first noticed, had a piece of paper about a foot square in his month. He flew with it over the bridge, and when in the air, dropped it. He at once flew under it and caught it, but let it go again and flew aside, when several others tried in turn to catch it. Some succeeded and some failed, and they kept at it till the paper had fluttered down uncomfortably close to the ground. Then they all flew up together and roosted on a telegraph wire to talk it over, their notes being very hilarious and quite different from a swallow's ordinary twitter. An observer, who goes to ball games sometimes, wondered if they were not canvassing the skill each displayed during his inning.

BAKERS' PROFITS.—A baker will toss a barrel of flour into a trough. Then he tosses 104 pounds of water on top of it. A quantity of yeast is added, and then the jolly baker has 300 pounds of dough to operate on. The 300 pounds cost him \$5. In short order the dough is turned into "twists," high loaves, pan loaves and other styles of the same quality. The oven's heat reduces the 300 pounds of dough to 260 pounds of bread. The baker sells his bread at the rate of four cents a pound, or at an advance of over 30 per cent over what it cost him. There are many bakers in this city who make 1000 loaves of bread per day, and sell it for from \$80 to \$150, or at a net profit of \$40. Little money is lost in the business, and most bakers do a cash trade. It is very seldom that bakers fail. The business is steady, reliable, and attended by very few risks, unless incompetent workmen.—*Herald of Trade.*

HORN-BORING INSECTS.—A correspondent of a contemporary writes: I have two powder-horns that have been hanging in a cupboard for some time. On looking them over recently, I find that there are several holes eaten or bored through them. The holes are about one-eighth inch in diameter, and look like the work of the apple-tree borer, but no insect was visible. Can you explain what made the holes? (Answer: Prof. Howard of the Department of Agriculture, Washington, says that objects made of horn are not infrequently subject to the attacks of insects of various orders, and notably of

Coleoptera of the families Dermestidae and Ptilinidae. The latter family (i. e., those species which have been observed to bore in horn) are too small for the size of the holes mentioned, but this size agrees very well with the holes made by species of the genus *Dermestes*, and among the various species of this genus, *D. valpinus* is most likely to have done the mischief. An accurate determination of the species in question is not possible, however, without seeing the specimens themselves. Frequent handling of objects made of horn, on exposing them to sunlight, will effectually protect them.

A NEW SCHEME.—A man recently presented a check at the baggage room in Danbury, Conn., and received in exchange a neatly painted box about the size of an ordinary trunk. A dozen expressmen at once desired his patronage. He smiled kindly, took out two long and two short sticks. The long sticks he fitted into staples at the upper and lower opposite corners of the box. The short sticks then became cross-pieces connecting the long ones, and the wheel found a place between the lower ends of the long pieces. Thus, quicker than it takes to tell it, the man had transformed his box into a wheelbarrow, and trundled it away. He returned in a few hours, repacked the wheel and sticks, and quit town on a west-bound train. He was said to be an agent for a religious publication house and resorted to the wheelbarrow device to save cartage money.

HOME-MADE ICE.—Take a cylindrical earthen vessel and pour 3½ ounces of commercial sulphuric acid and 1½ ounces of water into it and then add one ounce of powdered sulphate of soda. In the center of this mixture, place a smaller vessel containing the water to be frozen; then cover the vessel, and, if possible, revolve the whole with a gentle motion. In a few minutes the water in the small vessel will be converted into ice. The same mixture can be used a second or third time for making a block of ice. The operation should, if possible, be performed in a cool place—in a cellar, for example.

TO CLEAN OIL PAINTINGS.—The following recipe will be found valuable for the purpose: Mix well together two ounces of wood naphtha, one ounce spirits of salts, and a quarter of a pint of linseed oil. Before being used, the bottle containing them should be shaken. The application is simply with a soft pad of linen, to which should be given a circular motion. When nearly dry, give a second dressing, when the picture will come out in all its details.

RESTORING MOLDED PICTURE FRAMES.—Should any portion of the molding be destroyed, it may be restored by a composition made by boiling together some Venice turpentine, resin and linseed oil, then adding glue dissolved in water, and, finally, whitening, till the mass is brought to the consistency of putty. The composition is then shaped to supply the defective part, and is to be colored or gilded to match the rest of frame.

DYING OUT.—Two races of men are dying out—the Lapslanders, who number 30,000, and the Maoris of New Zealand, reduced from 100,000 to 45,000 since the days of Captain Cook, and likely to be extinct by the year 2000.

GOOD HEALTH.

Sweating It Out.

EDITORS PRESS:—I have read in the PRESS of Nov. 10th how a man cured himself of rheumatism—he "sweat it out." Of course I have known for a long time that all forms of rheumatism, including neuralgia, gout, etc., could be cured by the sweating process; but the man failed to say anything about the people who could not endure five such baths as he took. A strong, vigorous man might come out all right, but what about the weak ones who faint in a hot-water bath? If they should get "short of breath" in such an exhaustive bath, they might remain so.

To the weak ones who have rheumatism I would suggest the hot-air or Turkish bath, which have the same effect ("sweat it out") and leave the system vigorous and healthy.

I use what is called a blanket bath or pack, and for "chills and fever," ague, malarial fever, etc., they are a sure cure. I will give the fortune I expect to get from the next Havana lottery drawing for every case my blanket bath will not cure—I mean a positive, permanent cure. There is no use in being troubled with any form of rheumatism, or dreading any kind of fever or chills, in fact, almost any acute disease, if we understand and practiced "sweating it out." The important part of the process to learn is the how.

MRS. E. J. SQUIRES.
Redwood City, Cal., Nov. 21, 1888.

DIPHTHERIA CARRIED BY TURKEYS.—The following case is taken from the *British Medical Journal*: A fowl with diphtheria was brought to the house of a veterinary surgeon on April 24th and died on the 29th. The feeding and nursing of the bird devolved on a lad, aged 14 years, who was assisted by his brother, aged 5 years. On the evening of May 11th the writer was called to see the little boy of five, who had been poorly for a day or two. He had enlarged cervical glands on the left side, which had come on rapidly. He was a delicate little fellow, with fair hair and anemic aspect. The tem-

perature was 103° F.; pulse between 120 and 130. The fauces were more or less covered with diphtheritic membrane, the left tonsil more especially. Under the administration of the biiodide of mercury and iron, the throat symptoms cleared up and the child made a good recovery. On the day after this case was first seen, the boy who fed the fowl was very feverish, and had similar patches over his fauces, but not to the same extent as his brother. His throat was painted with bioglyceride. A sister, aged 9 years, had also a similar explosion on the fauces. Birk and acid and bioglyceride was the treatment. On the 18th the mother, who had nursed them, was attacked, and was similarly treated. They were all kept well up with beef-tea and stimulants.

THE BEGINNINGS OF INSANITY are more often overlooked or neglected than properly treated. This is the greatest cause that exists for the constant increase in the number of lunatics in every civilized nation. The fact that the patient seldom or never recognizes the danger to his mental health which is approaching, is one powerful reason for this neglect. Whenever there is persistent sleeplessness, a change in the sentiments toward those who should be nearest and dearest, and the development of ideas of an extraordinary or fanciful kind in a mind previously reasonable and well balanced, it is time that all sources of worry or any kind of mental strain should be removed as far as possible; that changes of scene should be had; and that every function of the body should be carefully examined into by a competent physician. This should be done at the very outset, otherwise suicide, homicide, or an offense against public morals may tell the friends and family altogether too plainly that the calling of a doctor has been deferred too long. There are many surgical affections which exemplify the warning this article is intended to convey. Of these, cancers and sarcomas afford the best examples. When small, and before they have infiltrated the surrounding tissues or sent colonies into distant organs, if removed by the surgeon's knife, they may or may not return. The chances vary a good deal, according to the variety of malignant growth which is under observation and its locality. But removal, and that at as early a date as possible after discovery, offers the best chance for life and freedom from suffering.

FLESH WORMS OR BLACK HEADS.—These are no worms and have no heads. To understand what they are, remember that there are sebaceous glands for the supply of oil for the surface of the skin, and that there are tubes leading from them to the skin. It is quite possible for the openings to become closed by dust and dirt (the blackness), the constant supply of the oil enlarging these, making them look like worms. Those who eat an unusual amount of greasy food are more liable than others to have them, or those having a sallow complexion, a dingy appearance, indicating a deranged state of the liver. Do not squeeze them, but apply a warm, wet cloth, so softening them that they will discharge, at least, by a gentle pressure. I recommend regular bathing weekly, using warm water with ammonia or castile soap, with the frequent use of the flesh brush. A very plain style of living, using no pork, will be favorable to cure.—*Brattleboro Household.*

FOR PAINS IN THE EAR.—According to the *Canada Medical Record*, Pavesi recommends a liniment composed of camphorated chloral, 2½ parts, pure glycerine, 1½ parts, oil of sweet almonds, 10 parts. This is to be well mixed, and preserved in a well-stoppered bottle. A pledget of very soft cotton is to be soaked in the liniment, and then introduced as far as possible into the affected ear, two applications being made daily. Frictions may be made each day with the preparation behind the ear. It is said that the pain is almost immediately relieved, and even in many cases the inflammation is subdued.

A SPEEDY CURE OF WHOOPING COUGH.—Mohr, a Norwegian physician, is reported to have been able to cure whooping-cough by means of inhalations of sulphurous anhydride. In the first instance this was done accidentally while disinfecting some rooms; subsequently it was done by burning six drachms of sulphur per cubic meter of space, the bedding, etc., being well exposed to its influence. After the room had been closed for four hours, ventilation was restored and the children put to sleep in the beds impregnated with the sulphurous vapors. In the morning the cough had ceased.

PNEUMONIA AND MICROBES.—It is generally supposed that pneumonia is due to the accidental penetration of specific microbes into the system, but the observations of M. Jaccoud, a French student of the subject, show that the disease really results from the development, under favorable conditions, of microbic germs permanently present in the system. A chief condition of such development is a sudden chill, which explains the frequent coincidence of lung affections with abrupt changes of temperature.

MANY will be glad to know that ground coffee digested in codliver oil quite overcomes the fishy taste of the latter.

A DISCUSSION of the Malthusian theory elicited the statement that clergymen, as a rule, have the largest families.

Curious Minera's of Utah.

Included in the mineral resources of Utah, apart from its precious metals, are deposits of alum, some recently discovered veins which are 18 inches thick and several hundred feet in length, of dazzling whiteness and great purity. Beds of nitre are also found sufficiently pure to readily fuse when thrown on hot coals.

Ozokorite or natural mineral wax, a rarity elsewhere, is here found in large quantities. It is air, acid and water proof, and can be used for imparting these qualities to other substances. As an insulator it is said to be perfect, and would doubtless be found a superior insulating material for electrical appliances. It could also be adapted as the base of a cheap, yet desirable, paving material, and for indurating piles and posts to prevent decay.

A somewhat similar discovery is gilsonite, found, on analysis, to contain about 80 per cent of carbon or asphalt in pure form.

Of the latter a vein has been discovered three feet wide and over a mile in length—a supply that, if worked, would be found almost inexhaustible.

As is now well known, the great Salt Lake is an immense, limitless magazine of salt, that can be readily obtained in any desired quantity by the simple process of evaporation.

From this lake vast quantities of sulphate of soda are also secured, blown on shore at certain temperatures by the winds, where hundreds of tons are often piled up in a single night, that can be utilized in the cheap production of sal soda and carbonate of soda.

MANAGEMENT.—A few days ago a prominent mining man of long experience in mines and mining business said to a representative of the *San Miguel (Col.) Journal*: "Most new mining companies make good assay showings of their ore, of ores of adjoining or neighboring mines. They are not worth the labor making them. I would rather have a good, reliable assay of the men who are at the head of the enterprise. That is all there is in a mine. When a company starts to develop a mine it never knows how much it is going to cost until they get through. Three of us may go to it. The other two may be ready to put up the full share of the money to strike the bonanza. I may get tired. They do not wait to develop my property for my benefit, and they become tired and quit. The mine lies idle for some time, and finally they sell out for little or nothing to get rid of it. The purchasers must have my third, and I get all I put in it, or maybe more. Then another company starts out, and it winds up the same way. Finally a successor strikes it rich, and the stock becomes very valuable, but it is only after successive companies have been organized and gone to pieces. The presumption is that all of these mines will be good, if the persons at the head of them will only stick together, but there is the rub, and that is why an assay of the men is of more moment than of ore. I could have bought Granite Mountain at one time at 18 cents, but at that time it was by no means certain that the company would hold together until it struck the vein. When it did strike it a dollar was cheap, because it was demonstrated that they had something to make them stick together."

LEASING.—A great part of the activity in mining matters during the past two years in and around Leadville, is directly traceable to the tribute system. In a number of cases, surface ground had either been badly worked or altogether neglected by company owners, and certain miners, cognizant of the facts, began to lease. Of course, the expense of surface workings was comparatively small and the profits, even at high rates of royalty, were good. This produced a sort of leasing craze, and parties with a little money and less experience in mining began to lease indiscriminately, and agreed to pay any royalty, supposing that the sure road to profits in mining was through the leasing system. The result of this was a large number of unprofitable leases, while the companies got their property developed more cheaply than they could have done it themselves. Then there was another class of properties that contained large bodies of ore which it was not profitable years ago to mine or treat. With improved facilities and reduced cost of smelting, however, these ores became marketable. Lessees, knowing this fact, in many cases reaped good profits, but that branch of leasing also was soon overdone and rendered unprofitable by excessive royalties. The facts are that the companies owning mines have begun to expect about all there is in a mine, and about as much more as they can get out of the average lessee. This accounts for some of the largest properties in camp being worked wholly under lease.—*Review.*

The bullion yield of the Con. California and Virginia mine for October was \$339,814, assay value of bullion representing a total gold value of \$282,000. This yield comes within less than \$5000 of covering the October expenses and November dividend.

The copper production of Butte, M. T., this year will crowd 120,000,000 pounds. And yet there is not a copper mine in the district that is developed below the 1000-foot station.

A. MONTIRICHARD, a miner employed at the Kennedy mine, Anador county, was drowned last week by falling into the sump.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CRAIN MINE.—Amador Dispatch, Nov. 24: This prospect, at Crain's ranch four miles above Plymouth, looks well. They are putting up an arastra for prospecting purposes. The Wildman mill at Sutter creek is shortly to be enlarged by the addition of ten stamps. The rock on the lower level is the best in the mine.

SOUTH SPRING HILL.—This mine continues on in the even tenor of its way. They have just put in a new hoisting engine of greater power than the old one. Something very much needed.

KEYSTONE.—The report that this property was about worked out is entirely false. The mine does not pay its old-time dividends of \$40,000 per month, yet it continues to turn out handsome profits for its owner. An abundance of good rock is in sight, and the Keystone will continue for years.

COSMOPOLITAN.—The east crosscut at this mine is in 40 feet. The ground continues to be very hard.

NORTH CALIFORNIA.—At this property they are crosscutting west. The company has secured the old Potosi mill and are giving it a thorough repairing. They expect to start crushing about the 10th of December.

GOVER.—The Gover mill has started again. They have plenty of water now. The new pipe will be connected with the hoisting works next week.

SOUTH SPRING HILL.—Ledge, Nov. 24: At this mine they are taking advantage of the idleness of the mill on account of scarcity of water, by changing the engine at the hoisting works. The engine heretofore in use is too small.

THE STRIKE IN THE NORTH STAR.—The developments in the North Star continue of a favorable character. A parcel of 60 pounds of rock was taken out the other day and pounded in a mortar, and yielded \$47 in free gold. The seam is still small, and in itself constitutes but a small step in the making of a mine. The great importance to be attached to it is in the promise which it holds out of further and more important developments. The drift has been run on the vein for 20 feet, and the ore body shows a tendency to widen out. The place where the quartz is found is fully 600 feet from the south boundary of the claim, so that there is ample room for an extensive ore chamber to exist within the limits of the mine.

MISCELLANEOUS.—The Plymouth Consolidated is engaged in hoisting water out of the shaft. The process is tediously slow, only one shift being employed. At the Talisman, which lies between the South Spring Hill and North Star, a test crushing of ore taken from the 900-foot level is being made at the South Spring Hill mill. They have a 4-foot ledge, and those who are well qualified to judge say there is no question about the rock being of a paying character. The section along the main belt between Amador and Sutter creek seems to be bigger with promise of mineral wealth than any other section of equal extent in Amador county. T. H. Goodman has a few men at work on the Quartz Mountain Overplus, making preparations in regard to the water supply for a resumption of work.

Calaveras.

TUNNEL.—Mountain Echo, Nov. 24: The tunnel of the London mine, owned by Reed & Jones, situated in Alhambra Flat district, is being pushed ahead quite actively. The boys expect to tap the ledge in a short time. This mine is in the slate and gouge formation and similar to the famous Gwin mine. The ore is also of the same character.

UTICA MILL.—Mountain Echo, Nov. 24: The recent rain has interrupted the carpenters employed in the erection of the Utica mill. The weather being clear at present, work is going on as actively as ever. The workmen are anxious to get the mill under cover before another storm sets in.

El Dorado.

ACTIVE.—Georgetown Gazette, Nov. 22: Judging from the stir now being made among prospectors and miners generally, an unusual amount of mining will be done this season.

LONE JACK.—We understand that the Lone Jack mine, this side of Garden valley, was started up last Monday under a new company. Nine men have been put on, lumber is being hauled for a boarding-house, and we hear that five more stamps will be added.

Inyo.

BELLEVILLE.—Inyo Independent, Nov. 10: Mr. C. A. Cross, superintendent of the Belleville mills, was at Independence this week. The mills have now been idle a long time and Belleville deserted in consequence. There is plenty of ore in the mines that would pay a fair profit with silver at or near its former value, but it will not pay to work at the low value of recent times. Very good reports come from the Dark Horse mine. About 12 men are at work there.

TIN.—The ledge of tin ore recently discovered by A. J. Davis near Independence station appears to improve rapidly with depth. Mr. Davis has men at work sinking a shaft. The ledge is now wider than the bottom of the shaft and the ore looks well. Geo. Storey has taken out about 80 tons of ore at the Poleta. It will be sent to the Maxim mill to be worked.

Los Angeles.

THE CORA BELLE.—Cor. Newball Times, Nov. 24: A fresh crew of men arrived to-day, and commence work tomorrow. The Rudd machine is working to perfection, and its equal was never seen; the company expects to pay a good dividend in January. There was plenty of rain last week and the creek got pretty high, but did not delay matters over half a day, repairing ditches, sluices, etc. The water washed away a box of fine tools, and one of the men struck it right when he said: "Oh, a few hours' work will turn out gold enough to pay for that, even if they are high!" I confidently think that there will be a hundred of these machines in the mountains within the next three months, each employing at least a dozen men, and paying good dividends. Prospectors are coming in in full force, for

the mines are advancing in value since Rudd's machine came into the district.

Mono.

OLD MONO DIGGINGS.—Homer Mining Index, Nov. 20: The Old Mono Diggings have yielded millions and are not worked out. There are fortunes in them yet, and some day they will boom again "on merit." Nearly every prospector and mine-owner in Homer district has visited Old Mono, and some were residents there in the palmy days that followed the discovery of gold. It is an interesting section and so near Lundy as to be no more than an appetizing walk for healthy men. Every now and then some of our prospectors, several of whom keep up annual work on their locations there, start in afresh to revive the old camp by resuming operations on quartz and placer claims, hoping to "make a strike," such as enlivened things at Monville and Dogtown in '62-'3. A few Chinamen still work there and some seasons make fair wages. There are several quartz veins from which considerable gold has been extracted by arastra process, but prospectors of limited means cannot continue operations to any great depth because of the heavy flow of water. The Virginia creek hydraulic mine, of which D. E. Jones is superintendent, is worked every season and employs quite a number of men, producing considerable quantities of gold. No doubt there are other localities to that section which would do as well if capital were employed in the same manner.

GOLDEN PRINCE.—Work will be resumed on the Golden Prince mine as soon as Amiot's mules finish packing May Lundy ore. Supplies for five months will be laid in, and the miners will barricade the portal of the tunnel and bid good-by to the rest of the world until spring thaws them out.

Nevada.

WASHINGTON.—Cor. Nevada City Herald, Nov. 24: The new mill at the Erie mine is in successful operation. It is an experiment, but it is believed by those competent to judge that it will prove a success. J. R. Richie went to Grass Valley last week, where he will put in several concentrators in that vicinity. Mr. Richie has a concentrator of his own construction, which is said to possess excellent features not before used. The cleaning of the bedrock at the Omega hydraulic mine is about completed, which will close the work for the season. Handicapped as the company is, they show commendable enterprise in pushing the work forward.

OLD MEADOW LAKE.—Virginia Enterprise, Nov. 22: E. D. Towne, who has just returned from Meadow Lake, says they are now successfully working the ores of that camp, and by a very cheap and simple process. It is a mechanical, not a chemical process. The veins of the camp contain a vast deal of iron and the gold is all rusty. It is therefore useless to attempt to amalgamate it on copper plates. It is caught in sluices similar to blanket sluices except that the bottoms of the sluices are covered with ordinary canvas. Blankets catch too much iron. Little besides gold remains on the canvas, and that is held so closely that it is almost impossible to wash it off. That which is caught besides gold is in the shape of particles of iron containing gold. The stuff saved in the sluices is so rich that it is worth about \$5000 a ton. This is roasted and is then ground in a pan. The grinding process so brightens the gold that it readily amalgamates. The slum that results from this grinding is blood-red. It makes a superior fire-proof paint and can be sold for about 3½¢ a pound. Several of the mid-time claims now pay a good profit by the simple process of working described above. Mr. Towne, who has long been down in New and in Old Mexico, says he thinks the chances better in Meadow Lake than in any place he has seen. He expects to see the old camp very lively next summer. Nothing will be done there this winter at milling ores.

THE MOUNTAINEER.—Ore enough is being taken out of the Mountaineer to keep the mill steadily running and the shaft is well under way for new levels. It is proposed to push it down to a depth sufficient to determine what is below.

THE MERRIFIELD.—The mill at the Merrifield is being run on tribute rock from ground north of the works. They have about 160 tons on the dump, which shows well on the plates and would seem to justify more extensive work than is being done.

Placer.

HEAVIER MACHINERY.—Placer Argus, Nov. 24: The Gray Eagle mine is being fitted up with heavier machinery. They have bought a 75 horse-power engine and two large Cornish pumps, a jack head and a plunger. There are three large boilers in position and the other machinery is being put up as rapidly as possible. A large building, 50x70, is to be erected and work in the shaft will be resumed in about a month.

THE HOGSBACK MINE.—Placer Herald, Nov. 24: This mine is about 2½ miles above the Indian Springs house, and extends in nearly an easterly direction across the divide. It has been prospected for years by a company that had sufficient faith in it to start a tunnel, which was subsequently abandoned on account of its being too high. In 1886 the mine was bonded to the French company which owned the Golden River, Red Point, and other claims in the Iowa Hill and Damascus mining districts. This company on May 1st of that year began grading at a point 500 feet below the top of the main ridge and 40 feet below the mouth of the old tunnel. On the 18th of May the tunnel was started. For 244 feet the tunnel was run by hand, but the remaining distance has been run by Burleigh drills. On the 3d of October last the tunnel had been driven into the mountain 900 feet, and at the present writing is 1300 feet in length. The rock is quartzite of varying hardness, but never so soft and shelly as to require timbering. At the 900-foot point the rock was extremely hard, necessitating the use of several drills to put in a hole for blasting. Although the rock was hard at the entrance, as high as 48.7 feet were made by hand drilling in one week. The Burleigh drills have made 73.5 in one week. The grain of the rock, which at the mouth crosses the tunnel at the distance of 900 feet, swings around 90 degrees, or, in other words, is parallel with the direction of the tunnel. This is a curious fact, and the change of direction is supposed to have been caused by the breaking down of the outer portion of the rock by some convulsion of nature. The tunnel is 7x8 feet and extends in a straight line on a grade of three-eighths of an inch to 12 feet, and is compara-

tively dry. The drills are run by compressed air. William Ralston is superintendent and J. T. McCall foreman of the mine. These young men deserve a deal of credit for the efficient and systematic manner in which they have managed the enterprise. They can give some of the veteran miners points in developing a mine. The tunnel has been run so far at a comparatively low cost, not exceeding \$12.42 a foot, including materials.

THE PIONEER QUARTZ MINE.—Herald, Nov. 24: This mine is situated near Damascus and is the property of ex-Senator Fair. The ledge is a big one, varying from a few feet to 40 feet in thickness. The tunnel is over 600 feet in length, and drifts have been run from it for a considerable distance along the lode. The rock is good milling-ore and very rich prospects have been taken from it. The company has built a very good wagon-road from the top of the ridge to the mine. The greatest undertaking is the building of a tramway from the mouth of the tunnel to the mill which is in process of erection in Humburg cañon. This tramway is 2430 feet in length, and is a trestle on which are laid the rails. The grade for a distance of 450 feet is about five feet to the rod. The cars will be run by an endless cable. A ditch has already been dug along the hillside to Damascus cañon, where dams have been built for the storing of water. The mill will have 20 stamps and will be ready to crush ore by the time water comes. This enterprise has given employment to quite a large force of men this fall, and will give quartz mining a new impetus in the Damascus mining district.

San Diego.

PERRIS HAS A MINING BOOM.—Perris Leader, Nov. 22: One year ago there was not a mine being worked in the entire Pinacate or Gavilan districts, 100 miles north of San Diego city, on the line of the California Southern Railway. To-day, upward of a dozen properties have been developed, and many of them being now prepared to place tons of good rock on the dump or at the stamp mill. The Moer mill will run hereafter as a custom mill, thus placing the means for successfully reducing ore and putting it into marketable dust in the hands of every miner in the district. A large force of men was put at work around the mill and mine last Saturday and kept busy pumping water out of the numerous shafts and making general repairs on machinery and shaft timber.

THE ALLEN.—A 50-ton sample of ore was taken out of the Allen mine last week and shipped to the National City sampling works. The result has not yet been made known, but should it prove satisfactory to the syndicate of St. Louis capitalists who own the mine we may confidently expect to see a large force of men put at work and the mine pushed to its full capacity. Old Menifee Wilson and partners took \$16,000 worth of yellow dust out of this property before they sold it to the Allen Co.

THE PLOMO MINE is the property formerly owned by Mr. Steele. He still retains an interest in the property, being one of the company formed several months ago to further develop the property. A shaft had been sunk to the ore and a tunnel commenced from a lower elevation to run horizontally into the hill until it intersects the shaft. This work has been going on steadily for weeks and but 100 feet of tunnel remains to be driven. The company has set up a hoisting apparatus. The product of this mine will be handled at the Moer mill.

THE CORONADO CLAIM.—A half interest in the Coronado claim was sold last week at a satisfactory price. The property is in the old Pinacate district, near Armentrout's place, where so much excitement has lately been created by rich discoveries. The opening and development of these properties has caused a rise in the valuation of other claims and a corresponding rise in the hopes of the owners. A majority of the properties are really valuable, inasmuch as gold in paying quantities can be taken from the ore. With increased facilities and reduction works near at hand the operating expenses will be reduced and the profit accruing to operators correspondingly increased.

THE REDUCTION WORKS.—National City Record, Nov. 24: The first cleanup of the National City Reduction Works occurred this week. The figures, of course, are known only to the managers of the works and owners of the bullion, but the run is said to have been a profitable one to all concerned. The bullion belonged to Ashenfetter & Co. of San Jacinto, who have the distinguished honor of receiving the first ever turned out of reduction works in Southern California. The success of the plant has been fully demonstrated, and it will be of incalculable benefit not only to National City, but in developing the mines of the county. A plan is now on foot to incorporate and secure enough paid-up capital to build a smelter and refiner without delay.

Shasta.

STARTED UP.—Redding Free Press, Nov. 24: Frank Wheeler of French Gulch has started up his five stamps since the rain, and in a few days will have 15 to 20 men employed in his mine and mill. The former is being developed systematically.

MILL MOVED.—Andrew Fife, who was in town last Tuesday, informed us that he has moved his quartz-mill from Old Diggings over to Flat creek to crush the rock taken out of the Haskell & Mott mine during the last two months. Big results are anticipated.

Sierra.

FOREST CITY.—Mountain Messenger, Nov. 24: The contract for sinking the shaft in the South Fork main tunnel has been let to Wyllie & Bradbury, price \$5.75 per foot, considered remarkably low. The object is to reach the bedrock in the channel. No one can tell how deep the contractors will have to sink, as the bottom may be reached in 10 to 30 feet below. Everybody is standing on tip-toe, awaiting developments, as very much depends upon the result of the present move.

RICH ROCK.—Cor. Mountain Messenger, Nov. 24: Last week, in company with B. F. Giddings and Capt. D. D. Wheeler of San Francisco, and F. R. Wehe, we visited the Gold Bluff quartz ledge, where we met Mr. Van Slyke, the proprietor of the mine. Samples of rock just brought out of the mine were very beautiful. The quartz was of milky whiteness, with bands of sulphurets of iron, galena and gold, the latter seeming, to the eye, to predominate. The white quartz bordering on the sulphurets was studded with gold on either side. The sam-

ple would run way up into the thousands of dollars to the ton.

Trinity.

NEW DITCH.—Trinity Journal, Nov. 24: The Trinity Gold Mining Co. has about two weeks more work on the new ditch. The completion of this ditch will give them earlier water in the winter and increase their water-supply through the season, and will be of material benefit in working the claim. Hon. W. T. Coleman of San Francisco was in town this week and went to East Fork mining district to look after his mining interest there. He expresses himself as favorably impressed with the outlook of his mine.

NEVADA.

Washoe District.

CROWN POINT.—Virginia Enterprise, Nov. 22: The prospecting drifts are in promising material. From these drifts over 240 tons of ore have been taken and shipped to the Mexican mill. Some repairs are being made to the hoisting works.

BELCHER.—A considerable amount of prospecting work is being done at several points from the 200 level downward.

SEG. BELCHER.—Good headway is making in the joint Belcher east drift on the 1100 level. Some stringers of quartz are showing in the face.

BALTIMORE.—Continue to extract high-grade ore from the upraise above the 338 level.

JUSTICE.—Ore assaying from \$20 to \$30 per ton is showing in the winze bottom, 38 feet below the 490 level. The new mill started up last Sunday and is working well and smoothly.

BULLION.—Explorations on the 500 and 640 levels have developed favorable indications for ore.

SIERRA NEVADA.—No. 4 west crosscut on the 520 level is still in quartz and porphyry.

UNION CON. AND MEXICAN.—The joint Union drift on the 1465 level is now in Mexican ground a distance of 143 feet.

YELLOW JACKET.—The hoisting works are working finely, and are shipping ore steadily to the Brunswick mill.

CHOLLAR.—The raise from the north drift on the 650 level continues in low-grade quartz. The west drifts on the 750 and 850 levels are still in clay and quartz.

POTOSI.—The 650 level south drift is showing clay and porphyry.

ALPHA.—The 500 level north lateral drift is north of the shaft 167 feet; the face is in clay and quartz. The south lateral drift on the same level is in south of the shaft 72 feet; the face is in quartz that assays from \$12 to \$20 per ton.

ALTA.—Extracting, crushing and concentrating 30 tons of ore daily, battery samples assaying \$63 per ton. Stripping 900 level ore by north and south lateral drifts.

SAVAGE.—On the 400 level the southeast drift was extended 15 feet; total, 49 feet. The northeast drift was extended 18 feet, total, 89 feet. Ore is being stoped from the north and southwest drifts on this level. Ore is also being extracted from No. 1 east drift and from the sill floor on the 500 level, from the 12th floor north from the 600-level chute and from the old stopes on the 450 level. The usual repair work is being done. During the week 624 tons were shipped to the Rock Point mill, the average battery assays of which were \$78.60 a ton. Bullion on hand, \$3204.24.

GOULD AND CURRY.—On the 450 level the west crosscut, 60 feet from the top of upraise from the 500 level, has been extended 30 feet; total length, 80 feet. Formation, quartz giving low assays.

BEST AND BELCHER.—On the 300 level the winze in west crosscut No. 1, 120 feet from the main north-west drift, has been sunk a total depth of 19 feet, passing through ore of fair quality. On the 625 level the work of repairing the main north drift is still in progress.

CON. CALIFORNIA AND VIRGINIA.—The usual quantity and quality of ore is being extracted from the breasts on the 1400, 1500, 1600 and 1650 levels. The prospecting drifts on the later level are passing into promising material at one or two points. Ore of a fair quality is being found in the old stopes at the south end of the mine on the 1950 level. The usual amount of ore is being shipped to the Eureka and Morgan mills. The California mills have been shut down for the purpose of making a cleanup.

SCORPION.—Still crosscutting from the 300 level north lateral drift.

ANDES.—Explorations resumed on the 350 and 240 levels.

OVERMAN.—Continue shipping 40 tons of ore daily to the Vivian mill.

OPHIR.—On the 1465 level the south drift started from the end of the old east drift from the shaft station, 300 feet in, is extended 203 feet and continues in a porphyry formation.

HALE AND NORCROSS.—On the 500 level, west drift has been extended 30 feet and is in a distance of 605 feet. The north drift was advanced 22 feet. This drift has been connected with the Savage crosscut on the Norcross northern boundary, which gives a good circulation of air. The west drift to connect with the north upraise has been advanced 25 feet and the north drift from the 6th floor has been advanced 10 feet in good ore. During the week there was hoisted 128 tons of pay ore from the 700 level.

CONFIOENCE.—The face of the raise from the 1200 level is still to ore of fair grade. A joint Challenge raise is to be made from the 1300 level. The daily shipment of ore to the Brunswick mill amounts to 144 tons, the average of which is \$23 a ton.

CON. IMPERIAL.—Repairs to the north drift on the 1100 level will soon be completed, when work will be resumed in No. 1 crosscut.

CHALLENGE CON.—An upraise joint with the Confidence is about to be made to prospect for the continuance of the vein below the 1200 level. The raise will start from the 1300 level. The daily average of ore shipped to the Brunswick mill is 35 tons. It assays (battery samples) \$23.39 a ton.

NORTH OCCIDENTAL.—This mine will be worked through the Occidental under the superintendency of Mr. Lyman. As a vein of paying ore has been

followed nearly to the line in the Occidental, the North Occidental starts off under favorable auspices.

UTAH.—The new station at the 600 level is about completed. From this station a drift will be run west to the vein.

OCCIDENTAL.—The north drift on the 100 level has developed a five-foot streak of ore that assays \$50 a ton. A considerable amount of ore has been extracted during the week and saved for crushing.

Bristol District.

OHIO.—Pioche Record, Nov. 17: The Roe Bros. are preparing to extract copper ore from the Ohio mine. A new wagon-road on the mountain-side is necessary, the making of which requires the removal of a large part of the old dump. It is now half finished, and it is expected enough ore will be found in the dump to pay for the whole work.

FURNACE.—E. Basset has been engaged for some time in constructing a small natural draft furnace for the reduction of copper ore. He hopes to have it in running order by December 1st. A furnace built there by him several years since on the same principle answers admirably for working lead ores, but some changes were necessary to protect the metal from drafts of cold air; this he thinks is now accomplished.

Jackrabbits District.

HOISTING PLANT.—Pioche Record, Nov. 17: The work of putting a steam hoisting plant on the Onondaga mine is progressing nicely. The excavation for the galloways frame and engine are made and the galloways frame about completed. It is expected the plant will be in running order in two weeks.

Pioche District.

AT WORK.—Pioche Record, Nov. 17: There are now over 30 men working for wages in the Pioche mines and paid regularly. Small as this may seem, it is an important matter for us. It makes a solid basis for what little business is done.

Safford District.

ASTRIKE.—Eureka Sentinel, Nov. 20: We see an item in some of the State papers to the effect that a very important strike has been made in the Onondaga mine, this county. The ore is said to go from \$200 to \$300 a ton. Several carloads have been shipped to Salt Lake. There is said to be plenty of high-grade ore in sight in the mine. The Onondaga property is owned by a San Francisco company. George Obriter, a thoroughly competent mining man, is in charge as superintendent. He is working a small force which may now be considerably increased. We are glad to hear of this development in the northern part of Eureka county. There are many other promising mines in Safford district. Cortez and Safford are two pretty good mineral sections in Eureka county territory.

ARIZONA.

CASA GRANDE.—Florence Enterprise, Nov. 10: From Mr. C. Loss, Supt. of the Golden West Mining Co., the following mining items from the Casa Grande mining district are obtained: Mr. Loss has been instructed by his company to receive proposals for 75,000 feet of lumber and timber for the erection of a mill at the Golden West mine, in the Bitterwell mountains, south of the Vekol. A 10-stamp mill is to be erected and the plant has been ordered. The mine has been crosscut for 36 feet through ore, and the wall has not yet been reached. Last month 150 feet of work was done, and the average of the ore sampled \$22 per ton in gold. A sample of 60 tons gave \$35.30 tons went \$57 in gold and between 60 and 70 ounces in silver. The outlook for this grand mine is very promising. Mr. Chris. Johnson is the foreman. The Ella Co., owning the properties recently held by the Monarch Co., is about to erect a 60-stamp mill. The outlook for this property is at present very encouraging. The Great Eastern, owned by Howell Hinds and L. D. Chilson, on the Vekol lode, has developed an eight-foot vein in place, of very rich ore, and the value of the property has thereby been greatly increased. The Vekol mill is to start up at once on ore from Argosy claim, belonging to the Messrs. Walker, and a good long run is expected to be made. The ore from the Argosy is of excellent grade and promises well. The Jack Rabbit mine, owned by W. C. Smith, has a carload of ore out that will net \$5000. A shipment of three carloads of this character will be made shortly. The Central Silver, in the east drift from the shaft, has made a crosscut showing 15 feet of ore. The west drift, at 100 feet from the shaft, shows nine feet of ore by crosscutting. This is on the 200 level. The shaft is down 235 feet and sinking is still in progress. The outlook for the district in which the above properties are located was never brighter than at the present time, and they are likely to give excellent returns as bullion-producers when the mills are set in motion.

PRESCOTT.—Journal-Miner, Nov. 22: T. J. Dunkle left to-day for Turkey creek, where he will put a force of men at work on the Scotch Lassie mine. The ore receipts at the sampling works, on Saturday, amounted to over 30,000 pounds, as follows: Congress, 24,000 pounds; Belle, 3500; Blue Dick, 3000. S. E. Fuller is working the old Marcus mine and getting good ore, which he will have worked at Kerr's mill, and ship the concentrates through the sampling works. A deed from James W. Aker to H. Goldwater and F. H. Taylor, for one-half of the Trap Rock mine, Walker district, consideration \$2000, has been filed for record. John McDermid continues to work a gold property on Lynx creek. He has been overhauling a big water-wheel to run an arastra, to work the ore with Charles H. and James Akers left to-day with a wagon-load of supplies for Lynx creek, to commence operations on their Trap Rock mine. J. R. Slack has purchased a half interest in the old Bullwhacker mine from John Curtin, and expects to commence work soon taking out ore. This mine has already made a big yield of good gold ore. F. M. Murphy, who returned yesterday from the Congress mine, says the main shaft is now down to a depth of 500 feet in good ore all the way. A level is being run at the above depth, while the work of sinking continues. Doc Bowen has returned from doing the assessment work on the Gray Eagle in the Bradshaw mountains. He says he struck very rich gold ore, running up in the hundreds of dollars per ton. Messrs. Harlan & Barrington, owners of the famous Howard mine, were in town to-day, with a bar of gold valued at \$1199 taken from the Chloride and Hoosier Boy claims, adjoining the Howard, and are

getting the Howard in shape to continue working it also. Dr. Day, who has recently returned from Weaver district, says that A. L. Kerr started up his new stamp-mill a few days ago on good gold rock, and everything was working satisfactorily. If the experiment proves entirely successful, and it is demonstrated that the ores can be worked successfully, the capacity of the mill will be increased. James Shirley returned yesterday from a trip through Turkey creek and the Hassayampa district. He says miners in those sections are hard at work taking out ore for shipment. Fred Sattes has opened up a splendid body of ore in the Alligator mine in Crook canyon. He has the shafts, drifts and tunnels all cleaned out, and Mr. Shirley says the property is looking exceedingly well.

WATERVILLE.—No sinking is being done at present in the main shaft. The station at the 500 is nearly completed. The usual development work throughout the mine is being done, and the usual ore shipments made.

BRITISH COLUMBIA.

SIX FEET OF ALMOST SOLID GALENA.—Donald Truth, Nov. 24: Last July a discovery that promises well was made on Toby creek. The ledge is a well-defined one with slate and granite walls. It is 24 feet from wall to wall, carrying mineral the entire width. The pay streak is fully six feet wide of almost solid mineral. The ore is a cube galena, carrying silver and a little gold. An assay made at Ottawa gave a return of \$66 in silver to the ton, and one made by McVicker of Salt Lake, Utah, gave \$72 in silver and \$1 in gold to the ton, besides going 78 per cent in lead. The district is about 20 miles up the creek, and a trail can be cut in at no great expense, as the country is not a rough one. There is close by an abundance of timber for mining purposes. William Rosamond, William Kirkpatrick and Geo. Stark, all of Golden, are the locators and owners of the claims. Toby creek empties into the Columbia from the west at a point about 100 miles up the river from Donald.

THE MCMURDO DISTRICT.—About a month ago Geo. McCabe secured a bond on several claims in the McMurdo district, intending to place them on the other side, but he did not go further than Vancouver for the needed capital. He passed through Donald Thursday on his way to Golden, intending to try and get supplies into the district so as to put men to work this winter. He will undoubtedly succeed, as he is evidently a hustler from way back. Lowe & Dainard sent a sample from their Crescent claim to McVicker of Salt Lake for assay. The return was \$226.03 in silver and \$8.44 in gold to the ton, besides 39 per cent lead and 11 per cent copper. Pretty good rock. McMurdo is likely to rival Toad Mountain in both extent and richness.

DAKOTA.

FLOAT.—Deadwood Pioneer, Nov. 22: President Franklin, of the Retriever Company, yesterday contracted for the transportation from the mine to the reduction works of 500 tons of ore, with privilege of more. A large amount of Golden Reward ore is already delivered at the reduction works, and is arriving at the rate of 10 tons per day. The waterworks system of the reduction works is quite an institution of itself, and complete in every detail. Two carloads of coke having been received, the Silver Queen smelter was started up again yesterday morning. A large quantity of ore is on hand, and the chances are that 50 to 60 bars a day will be turned out continuously henceforth. Good ore has been struck on the Lew Wallace ground, and the stock is likely to be in brisk demand before the close of the week.

MONTANA.

STRIKE IN THE DANIEL QUILP.—Inter-Mountain, Nov. 21: The lessees of the Daniel Quilp, a well-known property located in Deadwood gulch, and adjoining the Narrow Gauge on the west, have, it is reported, made an important strike of ore on the 150-foot level. At this point a level has been run in westward 300 feet and a crosscut driven about 20 feet to the north ledge, where a body of ore of good thickness was exposed, running between 50 and 60 ounces in silver. The lessees are William P. Forbis, who is a part owner in the property, and Mr. Fitzgerald of Gans & Klein's. They have enough confidence in its value to put up a new hoisting works, now nearly completed. Development is still progressing.

COBALT, TIN AND NICKEL.—John Ducie of this city, who has been mining in this Territory for the past ten years, while on a prospecting tour in Jefferson county recently, discovered a deposit of ore about 20 feet in length which struck him as something entirely different from the ore generally found in Montana. He broke off several pieces and brought them into Butte and had them sampled at the Williams smelter. The investigation by an expert chemist and assayer proved the rock to bear cobalt, tin and nickel, and to be especially valuable for the cobalt. Since snow has fallen, further investigation is impossible at this season. Mr. Ducie has not yet made a location and does not tell in which particular section of Jefferson county his discovery is located, and says there are no other mines in the vicinity, but he says the general formation of the country is of slate and porphyry. He intends to visit the place early in the spring for the purpose of further exploration. Mr. A. Eilers, of the Great Falls smelter, was in the city yesterday and stated that the company had just closed a contract with the Tiger Co., in the Coeur d'Alenes, for the purchase of all their product. About 15 cars of lead ores, he stated, are daily being received at the smelter, and preparations are being made for starting up all the furnaces.

NEAR TOWN.—New Northwest, Nov. 16: What promises to develop as a prosperous mining district, and is quite accessible, being only about eight miles east of town and some 3½ miles east of William Zosel's place, has been opened up to some extent this fall. The first discovery was made August 3d of this year, and the locations so far made are on Rocker and Deep gulches. Joseph Patterson and Jack Devlin have worked some on the Hidden Hand, and have out to 10 or 12 tons of ore that is estimated at 50 per cent lead and carrying 100 ounces of silver and have as high as four feet of lode. William and Gus Zosel have also made two or three promising locations. They are now building cabins and a road from Zosel's ranch and expect to work

on the mines all winter. W. P. Emery has also located the Carbonate Hill lode, from which he took a carload of ore which he this week shipped to Butte. It carries lead, gold and silver, and he expects a fair working result from it. The impression is that there are some good veins there and that the camp will turn out well as it is developed.

OREGON.

BLUE RIVER DISTRICTS.—Albany Herald-Democrat, Nov. 24: Messrs. Standish and Dyson of Brownsville returned from the Blue River mines last week. The Croesus claim has just got the returns from a ton of ore shipped to San Francisco. It milled them between \$79 and \$80, mostly gold, and the fate of the camp that has been so long hanging in the balance is at last decided, and there is much rejoicing; for now a road will be built and a mill go in the spring, and the work of active development will begin in real earnest. President John G. Wright of the Capital G. and S. M. Co. has received a letter from Supt. Anglin of the Capital mine, on the Santiam, to the effect that the mine is turning out a quality of ore that exceeds his highest expectations, and the quality of the ore grows better the deeper the shaft is sunk. The shaft is now down to a depth of 30 feet from the level of the tunnel, which is run from the base of the mountain. A few days ago a body of spar was reached that matted into almost pure copper when placed in a blacksmith's forge. The ore now turned out is said to be the richest ever found in the Santiam district. The members of the company are highly elated at the excellent prospects.

UTAH.

MINING REVIEW.—Salt Lake Tribune, Nov. 23: The output for the week has not been large; the attention of mining men is largely devoted to laying in supplies for the winter, and there is a general disposition to refrain from pushing production until the new administration comes in, the hope being that the Mexican lead ore imports will then be better regulated, and that something will be done for silver. The receipts in this city for the week were to the value of \$99,064.64, of which \$58,390.80 was bullion and \$40,673.84 was in ore. For the previous week the receipts were \$81,850.64, of which \$52,767.16 was in ore and \$29,083.48 was in bullion. The Ontario product for the week was in bullion, 20,363.22 fine ounces; no ore sales. The Daly output for the week was of bullion 16,099.17 fine ounces, and \$8161.46 from ore sales. The Horn Silver is quiet. No accounts are heard of ore extraction or shipment. Fine bar receipts in this city for the week were valued at \$16,099.17; base bullion, \$13,440; gold bar, \$797. The Hanauer smelter produced during the week bullion valued at \$18,435; the Germania, \$9619.63. Ore receipts in this city for the week were to the value of \$19,622.62 by Wells, Fargo & Co.; \$18,450 by McCormick & Co., including \$11,250 Crescent and \$1400 Queen of the Hills; and \$2601.22 by T. R. Jones & Co.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Nov. 29, 1888.

Trade the past week was quiet in all lines, due to the early approach of the holiday season and also to the general custom of winding up as far as possible all business at the close of December so as to commence the New Year with a thorough knowledge of how the business stands. Merchants report collections good, better than at this time in 1887. The banks report, as a rule, deposits increasing, with a falling off in remittances to the East for the purpose of meeting maturing obligations. They also report a lessened call for funds for grain, local securities and mining stock speculative purpose, with brokers dealing in the latter generally having a stronger account. Although reporting this, they look for an early revival of a boom movement due to stocks being concentrated by parties who buy to sell at a good profit, an improvement in several of the mines on the Comstock, and the payment of a dividend in next month by Confidence and Con. Virginia to be followed at an early day, unless some unforeseen event takes place, of dividends by the Hale and Norcross and Navajo, with a strong probability that Savage, Chollar, Potosi and two or three others will fall into line. With an active stock campaign, money will be in demand at good rates of interest.

SILVER.—Complaints are still heard of a scarcity in the supply and buyers at times compelled to pay a point or two above the European parity for spot parcels. Sales were made the past week at 94 to 94½¢, but at the close 93½¢ was bid and 93¼¢ asked. It is generally believed that next month there will be a most decided increase in the bullion output of the Qujotona, Tuscarora and Comstock districts, particularly in the latter, owing to more stamps dropping than for over ten years past. The ore, too, it is claimed, will generally average higher. This opinion is based on official and semi-official reports from the mines of important work now going on in Con. Virginia and other North-End mines, also in Hale and Norcross, Alpha, Exchequer, Challenge, Confidence and Yellow Jacket, with important work soon to be started in Seg. Belcher, Belcher, Crown Point and Con. Imperial. The Alta groups of mines are also beginning to attract attention. Of necessity, time will tell the story. The work in West Con. Virginia is being watched with a great deal of interest, owing to the expectation that it will demonstrate the fact of a west lode and also its value.

QUICKSILVER.—The demand on this coast is not up to expectation, although it is claimed that there will from several localities be a gradual increased consumption from now on; but, of course, this depends very materially on the result of the work now going on in several of the most important mines in each mining district. The export demand is fair.

LEAD.—The market is slow. Buyers appear to

be looking for a lower range of values. Spot is 10 cents lower.

COPPER.—The demand continues of an offish character. Dealers and consumers alike only buy in a hand-to-mouth way unless tempted by lower prices from outside sellers. The "syndicate" still holds a strong line on the market, compelling the most of consumers and dealers here and elsewhere to confine their purchases to them. All present information is confirmatory of a large increase next year in the output of this coast.

TIN.—Pig is tame, owing to consumers and dealers holding off for future developments. They are strengthened in this by the action of the European and Eastern markets. Plates are slow; spot continues weak. For that on the way the market is reported to be dull, as heavy consumers have bought to arrive their expected early wants in 1889, and therefore prefer to wait the future before buying more.

IRON.—The market is without essential change. The demand is slow, with consumers not disposed to buy much until the turn of the year.

COAL.—The market under heavy receipts and a light demand is weaker for both spot, nearly due and prompt shipment. For Australian it is reported that further concessions have been made, although quotations are not much lower. It is said that for April and May, sales have been made as low as \$9 and even \$8.50 per ton. Domestic coals are coming in more freely, with prices tending to lower figures.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Nov. 29, 1888.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	43½	44½	\$17 50	\$8 70	\$22 45
Friday.....	43 1-16	44 1-16	17 55	8 65	22 50
Saturday.....	43	43½	17 50	8 70	22 50
Sunday.....	43	43½	17 50	8 70	22 45
Tuesday.....	43	43½	17 50	8 65	22 25
Wednesday.....	42 15-16	43½	17 50	8 70	22 20

The market closed as follows: The recent advance in horax repels some buyers. There is no wavering in rates. California refined is quoted at 8½¢@9¼¢; concentrated, 8¢@8½¢. Lake copper was released as wanted by consumers at 17½¢; best, 16¢@16½¢. There was a large offering of pig lead at 2½¢@3¼¢. Refined petroleum—Barrels, \$7.25; plain cases, \$9.25.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, —@—; Billiton Tin, \$24.50@—; Banca Tin, \$24.25@24.50; Baltimore Copper, \$—@—; Orford Copper, \$16.00@16.25; P. S. C. Copper, —@—; Foreign Lead, \$4.75@5.00; Foreign Spelter, \$6.00@6.25; Antimony, \$10.00@13.50.

TIN.—The fluctuation in prices abroad has been responded to from here with rather a sharper movement; and sales on our floor have also run up to a total of 130 tons. Demand has been chiefly for futures; which have, however, followed the general tendency of spot values.

COPPER.—Although an improvement over last week to the extent that one sale has been reported, the market could not in reality have been much more dull. Under these circumstances it is hard to say that prices have had any decided tendency, but if anything they have been somewhat easier.

LEAD.—Transactions are considerably heavier, reaching a total of about 650 tons, but the increased activity has not been very evenly distributed. Prices have become firmer, however, especially for futures.

SPELTER.—When noticed at all, has been dull and weak, the net loss being about 10 or 15 points. **PIG IRON.**—Furnaces manage to keep clear of accumulations, and although the demand appears to be a little less urgent, prices are firmly maintained. Sellers say they have plenty of inquiries, and that prospects are entirely satisfactory.

MANUFACTURED IRON.—A great deal of business is doing, but prices are irregular, and not as firm as was anticipated they would be.

STEEL RAILS.—A bid of \$27 at mill is said to have been refused recently by three different mills on the line of the Pennsylvania Railway. The order was for 15,000 tons at each mill. This information comes direct from an undoubted authority, and may therefore be depended upon as correct.

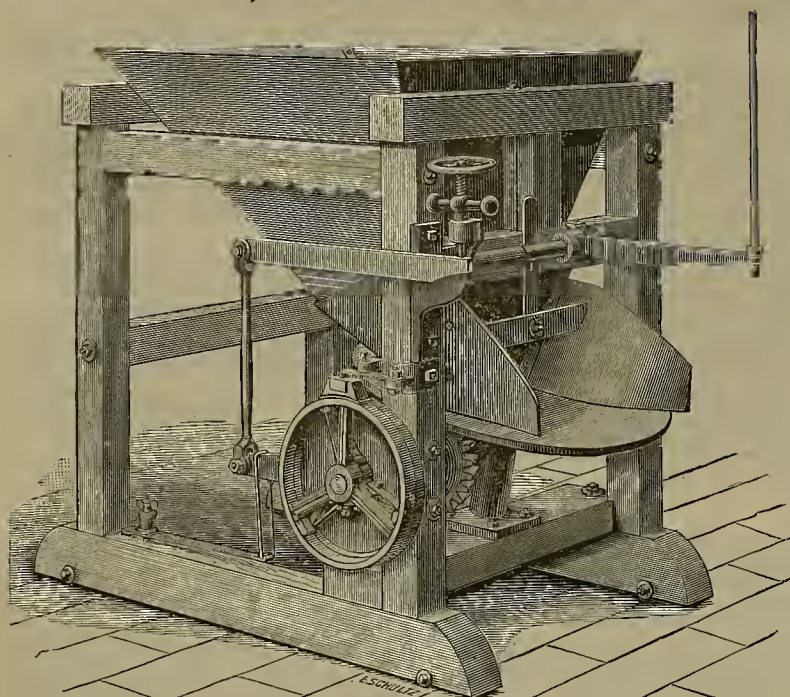
San Francisco Metal Market.

	WHOLESALE.	THURSDAY, Nov. 29, 1888.
ANTIMONY—French Star.....	13	14
BORAX—Refined.....	7½	7
Powdered.....	7½	7
Concentrated.....	6½	7
COPPER.....		
Bolt.....	26	27
Sheeting.....	26	26
Buck, 3½ bags.....	16 90	19 00
Fire Box Sheet.....	—	26
Iron—Glenbrook ton.....	—	—
Eginton, ton.....	—	—
American Soft, No. 1, ton.....	—	32 50
Oregon Pig ton.....	—	32 50
Clay Lane White.....	—	24 10
Shells, No. 1.....	—	22 00
Bar Iron (base price) ½ lb.....	22	3
Chrome iron ore, ½ ton.....	8 00	10 10
LEAD—Pig.....	5	5½
Buck, 3½ bags.....	17	18
Sheet.....	8	—
Pipe.....	7	—
Shot, discount 10¢, on 500 bags Drop, ½ bag.....	1 55	—
Chilled, do.....	1 95	—
Spelter—English, lb.....	16	20
Canton tool.....	9	—
Black Diamond tool.....	10	—
Pick and Hammer.....	8	10
Machinery.....	4	5
Toe Calk.....	14	—
TIN PLATE—Oke.....	5 00	5 15
Charcoal, 14x20.....	6 75	7 25
do roofing, 14x20.....	5 50	5 62½
Pig tin, ½ lb.....	24	25
QUICKSILVER—By the flask.....	40	43
Flasks, new.....	1 05	—
Flasks, old.....	85	—

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	Per Ton,		Per Ton
Australian ...	\$10 00	@11 00	Cardiff.....10 50@11 10
Liverpool St'm	9 00	@10 00	Lehigh Lump. 15 00@16 00
West Hartley.	11 50	@12 50	Cumberland bk16 00@16 50
Scotch Splint.	11 00	@12 00	Egg, hard,....15 00@15 50

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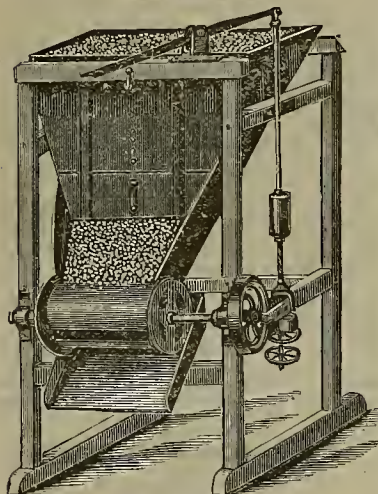
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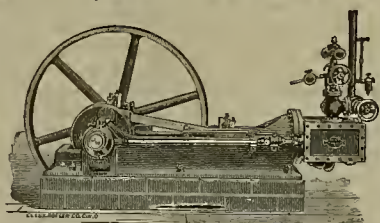
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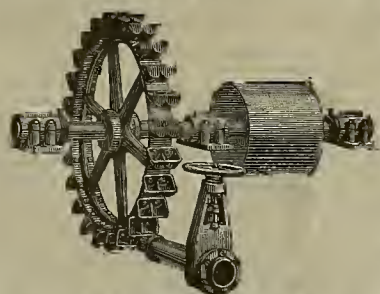
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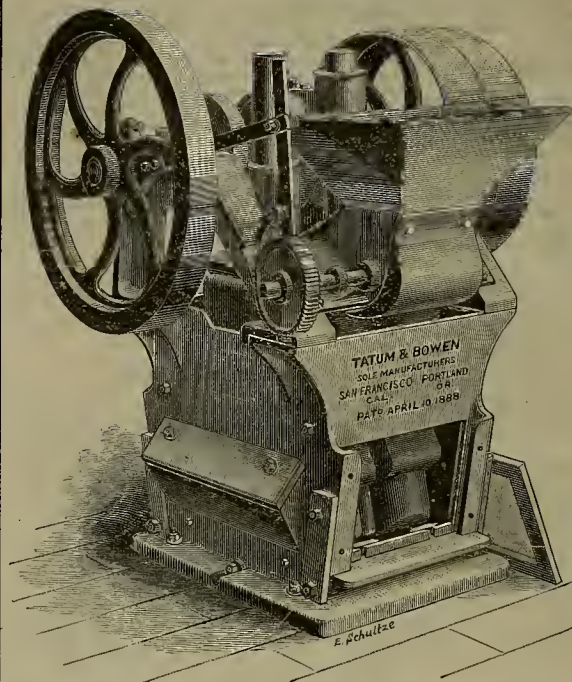
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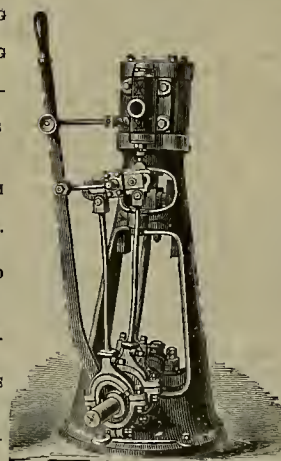
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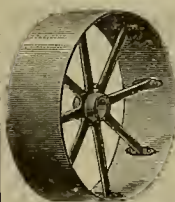
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Best & Belcher M Co.	Nevada.	41.	25.	Oct 16.	Nov 21.	Dec 11.	L. Osborn.	309 Montgomery St
Benton Con M Co.	Nevada.	13.	1.00.	Oct 29.	Dec 3.	Dec 24.	V. B. Allen.	330 Pine St
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Caledonia S M Co.	Nevada.	43.	15.	Oct 19.	Nov 21.	Dec 12.	A. S. Groth.	414 California St
Commonwealth Con M Co.	Nevada.	7.	50.	Nov 24.	Dec 23.	Jan 21.	H. Deas.	309 Montgomery St
Del Monte M Co.	Nevada.	1.	25.	Oct 15.	Nov 20.	Dec 12.	J. W. Pew.	310 Pine St
Found Treasure M Co.	Nevada.	4.	16.	Oct 25.	Nov 30.	Dec 21.	J. Stadfeld.	309 Montgomery St
Grand Prize M Co.	Nevada.	19.	25.	Oct 13.	Nov 17.	Dec 5.	E. R. Grayson.	327 Pine St
Gray Eagle M Co.	Nevada.	10.	05.	Nov 13.	Dec 18.	Jan 8.	O. H. Bogart.	327 Pine St
Horseshoe Bar Con M Co.	California.	1.	25.	Oct 9.	Nov 17.	Dec 10.	D. M. Kent.	330 Pine St
Keyes & Co M Co.	Nevada.	3.	25.	Oct 22.	Nov 24.	Dec 15.	M. P. Minor.	328 Montgomery St
Lord of Lorn M Co.	Nevada.	4.	10.	Nov 13.	Dec 23.	Jan 22.	L. G. Harvey.	313 California St
Live Oak Drift Gravel Co.	California.	10.	05.	Nov 19.	Dec 21.	Jan 16.	J. Morizio.	328 Montgomery St
Mayflower Gravel M Co.	California.	43.	50.	Oct 16.	Nov 16.	Dec 10.	J. Morizio.	328 Montgomery St
Montrose M Co.	Colorado.	14.	14.	Oct 3.	Dec 24.	Jan 23.	F. E. Lutz.	330 Pine St
North Belle Isle M Co.	Nevada.	13.	50.	Oct 23.	Nov 27.	Dec 19.	J. W. Pew.	310 Pine St
North Con M Co.	Nevada.	4.	20.	Oct 15.	Nov 19.	Dec 11.	J. W. Pew.	310 Pine St
Puget Sound Iron Co.	Wash Ter.	12.	1.10.	Oct 23.	Nov 29.	Dec 21.	A. Halsey.	328 Montgomery St
Russell Reduction & M Co.	California.	13.	10.	Oct 18.	Nov 26.	Dec 17.	J. Morizio.	328 Montgomery St
Sierra Nevada M Co.	Nevada.	33.	25.	Nov 9.	Dec 13.	Jan 2.	E. L. Parker.	309 Montgomery St
Tuscarora Con M Co.	Nevada.	3.	10.	Nov 8.	Dec 17.	Dec 31.	J. J. Scoville.	309 Montgomery St
Win Fend M & Co.	Nevada.	3.	10.	Nov 8.	Dec 17.	Dec 31.	J. J. Scoville.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Baltimore M Co.	Nevada.	A. R. Grim.	402 Montgomery St.	Annual.	Dec 4
Head Center & Tranquility M Co.	Arizona.	J. W. Pew.	310 Pine St.	Annual.	Dec 4
Merion M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual.	Dec 4
Omlak M Co.	Nevada.	D. M. Kent.	224 Montgomery St.	Annual.	Dec 4
Tuscarora Con M Co.	Nevada.	J. J. Scoville.	309 Montgomery St.	Special.	Dec 4

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	Oct 11
Confidence S M Co.	Nevada.	A. S. Groth.	328 Montgomery St.	1.00	Aug 6
Caledonia S M Co.	Nevada.	A. S. Cheminant.	328 Montgomery St.	08	Nov 26
Candelaria Con M Co.	Mexico.	C. T. Givens.	221 Market St.	50	Nov 12
Eureka Con M Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	50	July 3
Mt Diablo M & M Co.	Nevada.	E. W. Heath.	318 Pine St.	25	Aug 27
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	Nov 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50	Aug 8
Idaho M Co.	California.	J. F. Lightner.	Grass Valley.	50	Oct 11

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING NOV. 8.	WEEK ENDING NOV. 15.	WEEK ENDING NOV. 22.	WEEK ENDING NOV. 29.
Alpha.	3.25	3.50	3.40	3.70
Alta.	2.90	3.50	3.55	4.00
Andes.	1.20	1.80	1.00	1.70
Argenta.	1.15	1.00	1.00	1.15
Belcher.	7.75	8.00	7.75	7.50
Best & Belcher.	7.75	8.00	7.75	7.50
Bullion.	1.10	1.30	1.35	2.00
Baltimore.	1.70	1.75	1.70	1.60
Belle Isle.	1.70	1.75	1.70	1.60
Bodie Con.	2.00	2.10	2.10	2.00
Benton.	1.25	1.75	1.60	1.75
Bodie Tunnel.	1.25	1.75	1.60	1.75
Bulwer.	1.25	1.75	1.60	1.75
Con. Va. & Cal.	1.01	1.25	1.15	1.25
Challenge.	7.75	8.00	7.75	7.50
Champion.	1.25	1.75	1.60	1.75
Chollar.	3.50	4.00	3.70	4.00
Confidence.	20	22	17	18
Con. Imperial.	1.00	1.10	1.05	1.25
Caledonia.	.50	.60	.55	.65
Con. Pacific.	.50	.60	.55	.65
Crown Point.	7.25	8.25	7.50	8.25
Crocker.	.45	1.00	1.00	.95
Central.	.45	.45	.45	.45
Dudley.	.40	.45	.45	.45
East B. & B.	.40	.45	.45	.45
Eschbacher.	1.50	1.70	1.65	1.85
Grand Prize.	.40	.45	.45	.45
Gould & Curry.	4.40	4.95	4.60	5.00
Hale & Norcross.	6.00	6.25	6.15	6.35
Holmes.	.65	.70	.65	.75
Independence.	.65	.70	.65	.75
Iowa.	.65	.70	.65	.75
Julia.	.65	.70	.65	.75
Justice.	2.15	2.65	2.30	2.65
Kentuck.	3.50	3.85	3.65	4.05
Lady Wash.	.65	.70	.65	.75
Martin White.	1.50	1.60	1.60	1.70
Mono.	4.70	5.20	4.95	5.40
Mexican.	4.70	5.20	4.95	5.40
Mt. Diablo.	2.50	2.50	2.50	2.50
Northern Belle.	2.60	2.70	2.50	2.60
Navajo.	2.20	2.30	2.30	2.40
North Belle Isle.	2.20	2.30	2.30	2.40
Niagara.	3.00	3.10	3.00	3.10
New Queen.	3.10	3.20	3.10	3.20
N. G. & O.	2.20	2.30	2.30	2.40
Occidental.	2.20	2.30	2.30	2.40
Optim.	7.25	8.00	7.75	8.00
Overman.	2.25	2.50	2.35	2.65
Potosi.	3.25	4.20	3.90	4.20
Peerless.	1.50	1.80	1.65	1.80
Peer.	.55	.70	.65	.75
P. Sheridan.	.55	.70	.65	.75
Silver Star.	.55	.70	.65	.75
Savage.	4.65	5.25	4.95	5.40
S. B. & M.	3.90	4.15	4.00	4.25
Sierra Nevada.	4.20	4.55	4.45	4.80
Silver Hill.	.75	.80	.75	.85
Silver King.	.75	.80	.75	.85
Scorpion.	.75	.80	.75	.85
Syndicate.	.75	.80	.75	.85
Union Con.	4.20	4.55	4.45	4.80
Utah.	4.20	4.55	4.45	4.80
Yellow Jacket.	6.75	7.00	6.50	7.25

Sales at San Francisco Stock Exchange.

WEDNESDAY NOV. 28.	100	Hale & Nor.	6.37
600 Alta.	3.00	300 Julia.	1.45
650 Alpha.	3.00	300 Justice.	.95
670 Belcher.	6.75	300 Mexican.	5.00
430 B. & Belcher.	7.75	50 Navajo.	2.50
100 Baltimore.	5.50	100 New York.	3.50
100 Belle Isle.	5.50	250 N. Belle Is.	2.50
100 Caledonia.	5.50	300 Optim.	7.87
150 Challenge.	5.57	250 Overman.	2.00
70 Chollar.	4.05	120 Potosi.	3.75
100 Commonwealth.	4.90	45 Savage.	5.00
275 Con Va. & Cal.	11.50	160 S. B. & M.	3.50
430 Crown Point.	6.00	200 Silver King.	1.00
850 Con. Imperial.	1.05	400 Utah.	1.65
800 Eschbacher.	1.40	400 Union.	1.70
750 Grand Prize.	.85	400 W. Comstock.	.85
50 Gould & Curry.	4.65	615 Yellow Jacket.	5.37

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The output of the coal mines near Albuquerque, N. Mex., is 450 tons a day.

For Market Report See Page 365.

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Assessment Notices.

William Penn Mill and Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Devil's Gate Mining District, Lyon county, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 8th day of November, 1888, an Assessment (No. 3) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 69, Nevada Block, No. 309 Montgomery street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 13th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 31st day of December, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. J. SCOVILLE, Secretary.
OFFICE—Room 69, No. 309 Montgomery street, San Francisco, California.

Lord of Lorn Gold and Silver Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 13th day of November, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 28th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 22d day of January, 1889, to pay the delinquent Assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.
OFFICE—313 California St., San Francisco, Cal.

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Applications, stating Candidate's age, accompanied by copies of testimonials, must be sent, on or before the 12th of December, 1888, to The Agent-General for New South Wales, 6, Westminster Chambers, London, S. W.

SAUL SAMUEL,
Agent-General for New South Wales.
1st November, 1888.

THE BUFFALO CONSOLIDATED GOLD

Mining Company, Sierra City, Cal., Ernest Busch, Superintendent. Stock divided into 600,000 shares at \$1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 9 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10-stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Sup't, or Hugh Murray, Sec'y.

THE CALIFORNIA CONSOLIDATED

Gold Mining Company, Sierra City, Cal., A. Schubert, President; Alvin Fischer, Secretary; A. Leifer, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two locations. Ore assays \$7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

California Inventors

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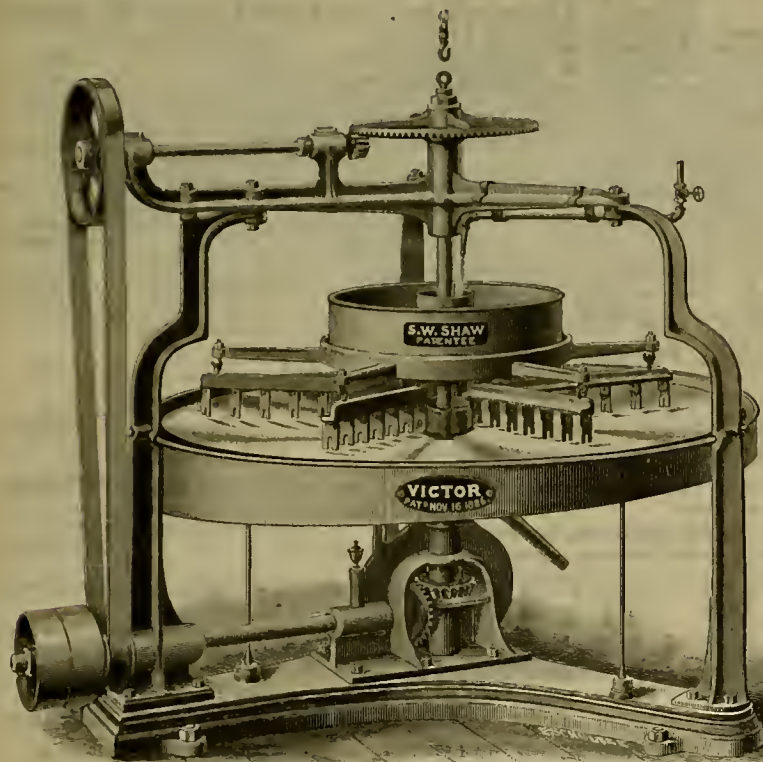
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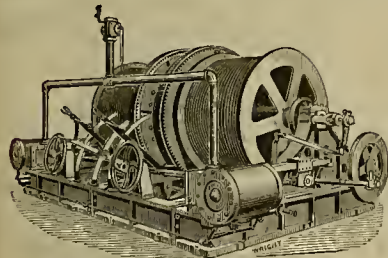
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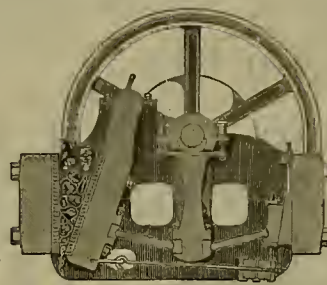
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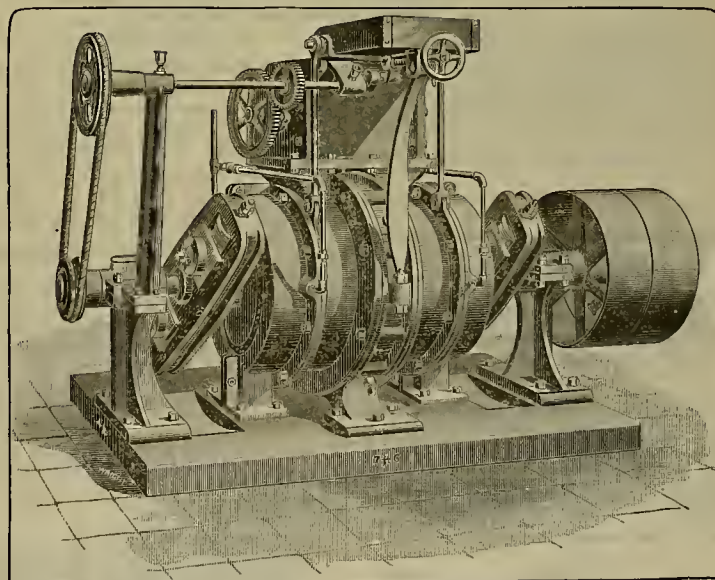
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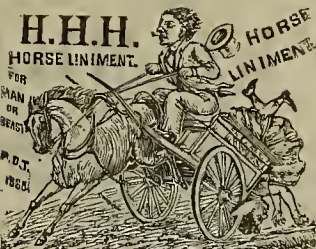
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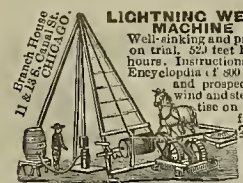
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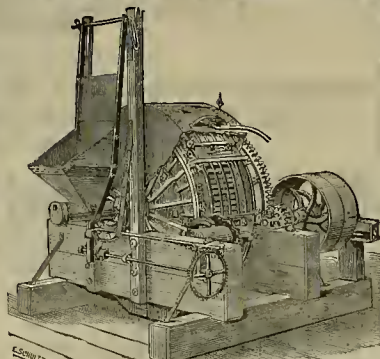
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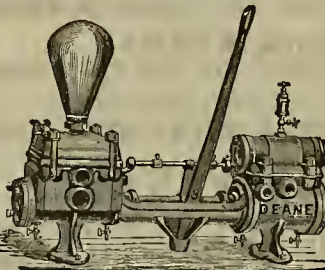
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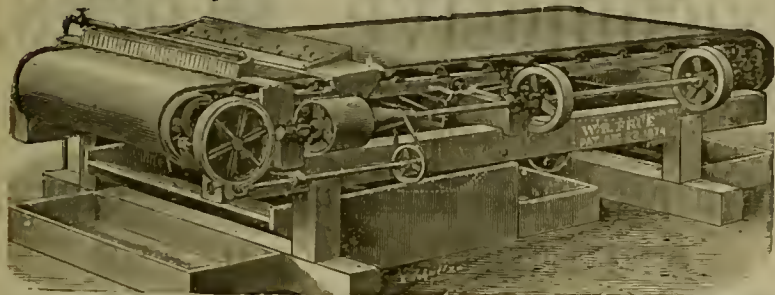
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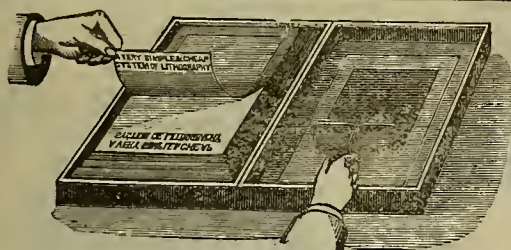


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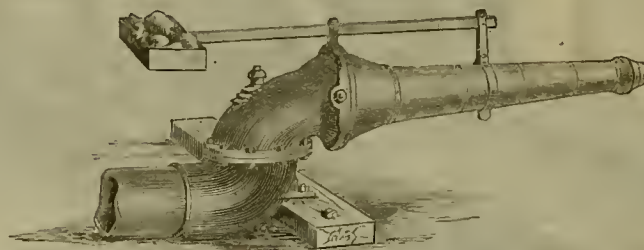
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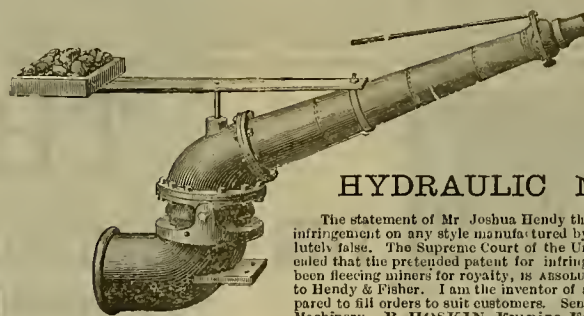


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Full Descriptive Circulars of any of the above sent on application.

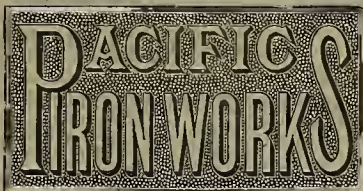
of Tyres will crush 1500 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "peon" earning one dollar per day has complete charge. In regard to slitting, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slimes is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequalled by any mill now in existence.

Yours truly,

D. M. BURNS, Superintendent

OFFICE OF THE CANDELARIA CONSOLIDATED MEXICAN MINING CO.,
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Risdon Iron Works, San Francisco—GENTLEMEN: Our Company has been operating three of the 4-foot Bryan Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60 mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set



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Pacific Iron Works—GENTLEMEN: In answer to your request for my experience with the Gates Crusher would say, that I have used one for the past three years crushing trap rock, basalt and granite for making concrete, the most of it being very hard and calculated to test severely the strength and durability of any machine.

I have crushed in that time probably not less than 10,000 tons of this material, without any repair being necessary, and without any change of shoes and dies, and, as far as I can judge, they appear to be good for as much more service.

I have had more or less experience with nearly every crusher in the market, and regard the Gates as infinitely superior to them all. In fact its efficiency, durability and capacity for work is simply wonderful. For crushing all kinds of ore, ballast or macadam—fine or coarse—nothing can compare with it. You are at liberty to refer any parties to me who may want further evidence as to the merits of this remarkable machine. Very truly yours,

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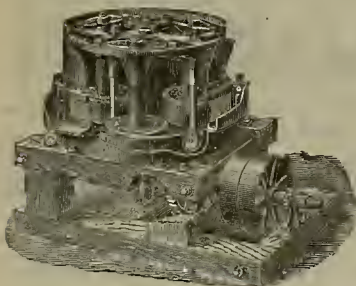
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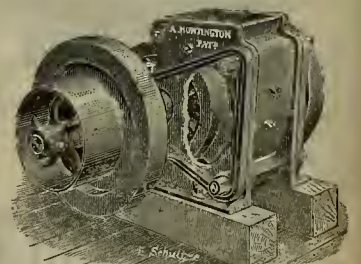
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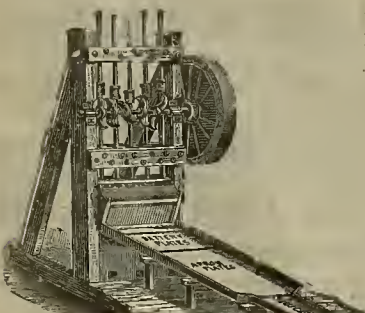
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SAN FRANCISCO, SATURDAY, DECEMBER 8, 1888.

VOLUME LVI.
Number 23.

Jewell's Patent Water Purifiers.

The subject of water purification is of such vital importance to every man, woman and child, that it claims the earnest attention not only of the sanitarian, but of the entire public. All are interested in and anxiously awaiting the successful solution of this problem.

It is not within the scope of this article to relate the history of the efforts which have been made by scientists to produce pure water; it is, however, deemed proper to present certain facts demonstrating what has been accomplished, and proving that a "Pure-Water System" has been devised, and that by its use the problem has been solved in a practical manner, upon a scale of any magnitude, and at a minimum cost of construction and maintenance.

The construction of the filter, which is illustrated on this page, is such that the valve-system is connected to the side of the filter, which places the valves conveniently within easy reach of the attending engineer. These filters are so constructed that they can be connected to deliver the purified water on either the right or left side, as may be required.

There are simply three connections to be made: One to introduce impure water, one to discharge the purified water, and the third to discharge the wash-water. In this system the main arms are made of extra strong pipe, while all of the lateral arms and their branches are heavy brass tubing with brass fittings leading to the patented brass sand cone valves, by the use of which the attendant is enabled to reverse the currents of water in the filter, thoroughly cleansing the sand of all impurities in an exceedingly short period of time; and the construction is such that during this operation there is no possibility that the filtering material can be washed out. These cone valves are automatic and positive in action, and it is a mechanical impossibility for them to become inoperative, as they open and close only by the water used in cleansing the filter. The outlet apparatus is fitted with an aluminum bronze screen, which cannot corrode, and the tensile strength of which is greater than that of steel. While the filter is being washed a separate current is forced in a reverse direction through this apparatus, thus insuring its perfect cleansing.

In purifying water, whether for potable, domestic or mechanical uses, it has been found to be absolutely necessary to use a coagulating substance to collect the impurities in order that they may be arrested and removed by the filter.

To accomplish this necessary feature a sight-feed pressure and vacuum chemical apparatus have been devised, which are shown in Figs. 2 and 3, herewith illustrated, the former, No. 2, being used when the filter is connected to a supply-pipe under pressure, such as a city main or reservoir, and the latter, No. 3, when the water is supplied by a pump.

Both of these devices are automatic and positive in action, allowing only a fixed quantity of chemical to pass into the water while the filter is in operation, and when the filter is shut off the flow of chemical ceases, thus preventing its waste. Opening the valves of the filter will cause either apparatus to work automatically. The "pressure tank" is attached by cutting out a short section of the vertical supply pipe and inserting the apparatus. The pressure of the water passing through the tank will cause the chemical to be forced into the supply pipe, where the desired chemical change in the im-

purities contained in the water will have occasioned. The "vacuum tank" is connected to the suction pipe, or into the suction head of the pump.

In operation, every stroke of the pump causes a fixed quantity of the coagulant to pass into the suction pipe, and thence through the pump,

can be attached to one filter; and when properly regulated there will not be found a trace of the chemical used for the coagulant in the purified water delivered from the filters.

The chemicals used in this pure-water system form new combinations with the impurities contained in the water and are precipitated and

established where analyses of waters will be made, without charge, to determine the treatment requisite for its purification. In order to insure an accurate analysis, it is important that not less than two gallons of the water shall be forwarded, and that such sample shall be sent in glass and carefully corked and sealed. A copy of the analysis will be promptly furnished and the necessary treatment recommended, and, if proper, a guarantee be given.

The claims which are set forth for the "Jewell" pure-water system are: First, absolute perfection in purifying and softening waters; second, simplicity of system; third, quickness in cleaning; fourth, positive assurance that filter bed is perfectly clean after each washing; fifth, durability—no springs or complicated valves to be soon worn out; sixth, strength in construction of all parts; seventh, steady and regular feeding of the coagulating or precipitating chemical.

Many testimonials are at hand demonstrative of the peculiar merits of this pure-water system. Among them is one from the Calumet and Hecla Mining Co., which has been using

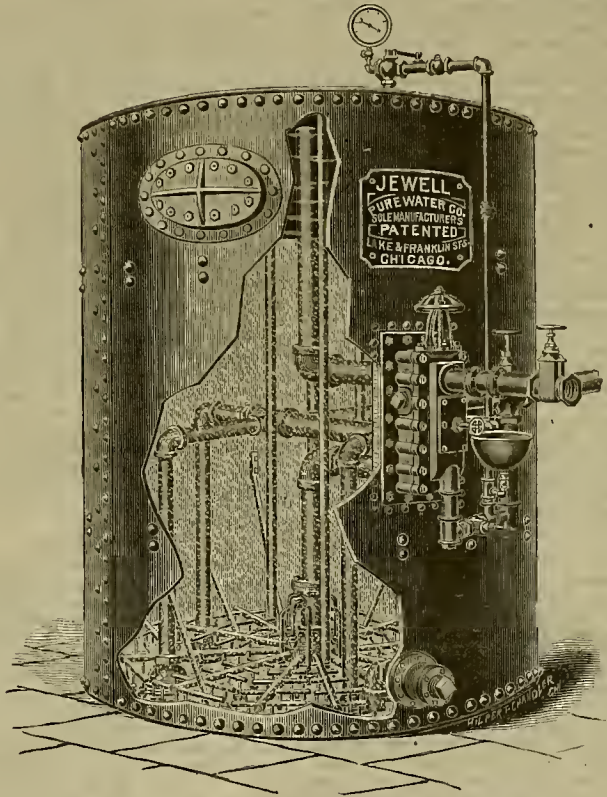


FIG. 1.—THE JEWELL WATER PURIFIER.

where, it becomes intimately intermixed with the water, thereby producing a perfect aggregation or coagulation of the impurities contained in the water. Inside of the tank a ball cock is placed which controls the flow of water and retained in the filter-bed and passed off when the filter is washed.

Organic and other matter can sometimes be removed by the intimate intermingling of air with the water in its passage to the filter, the

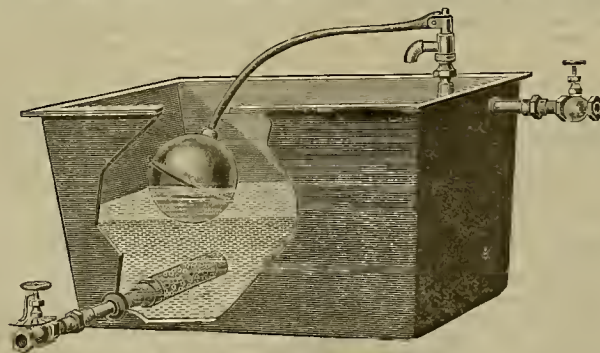


FIG. 3.—VACUUM CHEMICAL TANK.

automatically supplies the necessary quantity to replace that which is drawn out by the pump, and prevents any overflow or waste of the chemical. This tank is open at its top, and the quantity of chemical being used can be noted and replenished when required.

By either of these methods, the desired quantity of coagulant can be fed with absolute correctness, and, when necessary, two or more tanks

oxygen of the air tending to destroy the germs and organic impurities, which then pass to the filter and are retained in the sand. Water that has been thoroughly aerated, especially under pressure, and then filtered, is as free from dangerous matter and as near perfectly potable as can be obtained.

In connection with the manufacture of these purifiers, a fully equipped laboratory has been

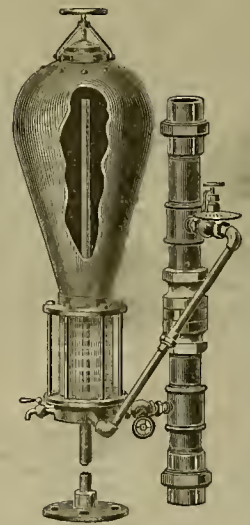


FIG. 2.—PRESSURE CHEMICAL TANK.

two of the Jewell filters for filtering the mine water for use in boilers. They have very much improved a very filthy water, and enabled the company to use it for feed, a thing for which it was before entirely unfit.

The Joshua Hendy Machine Works of Nos. 39 to 51 Fremont street are the agents for the sale of these purifiers, and those who are in favor of using pure water, whether for domestic or mechanical purposes, should send to them for catalogues illustrative and descriptive of this system.

MINE FIRE.—A fire has broken out in the Calumet No. 3 shaft of the Calumet and Hecla copper mines, Lake Superior. It was only a few months since that a fire in these mines was extinguished which had been burning many months. It is expected that the new fire will have some effect on the copper market, these mines being among the largest producers in the United States.

DIVIDENDS were paid in this city by mining companies in November to the amount of \$264,250.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—Eds.

The Mines of Plumas, Sierra and Nevada Counties.

EDITORS PRESS:—On a recent tour of the important mining districts embraced within Plumas, Sierra and Nevada counties, I jotted down some notes that I thought would perhaps be worthy of a space in your journal. Taken all in all, there is not probably a more interesting region on the Pacific Slope. Here may be seen, nestled amid lofty mountains, the most beautiful valleys of greater or less size, the fertility of which can scarcely be excelled anywhere; but it is of the mining enterprises that I wish particularly to speak.

The Greenville District.

Once the liveliest in Plumas county, is now, owing to legal difficulties and mismanagement of some of the important mines, quite dull. There is, however, an exceedingly bright outlook, and a revival of its former prosperity is but the question of a very few years at farthest. All agree that the mineral is here, and only needs more capital and well-directed energy to bring it to the surface. The faith of old times is shown on every hand by the works. A number who have made considerable money here are using it freely in developing claims that promise rich returns. One of the highest enterprises here is the

Round Valley Reservoir

And water-works, owned by Messrs. McGill & Bidwell. The reservoir is at an elevation of 800 feet above Indian valley. Its construction was commenced in 1868, and up to this date represents a cost of over \$100,000. Its purpose is to supply the mines of the district with the necessary water. Those dependant upon the reservoir are the Johnny Ball, Drury, Pacific, Forest King, the Cherokee group, Round Valley Consolidated, New York, Plumas Con., O'Tool & Summit, McLellan claims, Green Mountain and others. The company have eight miles of ditch for the distribution of the water, on the line of which is an inverted siphon composed of 5000 feet of 22-inch pipe crossing a canyon under a pressure of 400 feet. The company make their basis of rates for water furnished on 50 per cent of cost of steam-power, including the water used for battery purposes. This estimate is made with the assumption that both plants are on the ground. Thus, while furnishing the company with a handsome revenue, the mines are supplied at an exceedingly low cost. As high as \$1400 per month has been realized by the company from the water. Owing to tight winters for the past two years, the supply of water, which depends upon snow and rain, has been short and the company has been unable to supply the demand. They have hopes to secure a good supply this season. The dam proper is 300 feet long and 25 feet in height, constructed with a rock wall in center and loose dirt on sides. It is the most natural site for a reservoir imaginable, and its location is quite picturesque. It covers 800 acres and will hold an average depth of 15 feet of water, and has a watershed of 40 square miles. An item of no small moment is the fact that it is surrounded by miles and miles of the best timber in the State, from which must ere long spring a lumbering industry of great magnitude. Then will this great water storage be of utility in furnishing the power to run the mills that will be called into operation by lumbermen, after which it may be conducted to the fertile lands of Indian valley for irrigation.

Promising Mines.

One of the most promising mines of this district, about which little has been said, is the Drury, owned by a gentleman of that name. Tunnel No. 2 is now in over 450 feet; they are still driving ahead, and taking out quartz (free milling) which assays an average of \$20 per ton. From an extra vein lately discovered Mr. Drury extracted 50 pounds of ore, which, after retorting, yielded nine ounces of pure gold.

The Crescent mine—J. W. Whitney, superintendent—is still paying well. Two and a half millions is said to have been taken from this mine since its discovery in 1860. Capt. J. McDonald of your city is the fortunate owner.

The Green Mountain suspended operations about one year ago on account of financial embarrassments and lack of water. It is an extensive mine and has a 60-stamp mill. Mr. C. G. Rogers, the superintendent for the last 13 years, informs me that it is expected to resume operations next spring. What mines exist in the neighborhood of Quincy, the county seat of Plumas, seem to be entirely at rest, and, in consequence, a decidedly rural quietude reigns over the town. The Meadow Valley district is also taking a kip Van Winkle snooze. However, I was informed by Mr. Kellogg of the firm of Kellogg & Thompson that prospects are brightening. The Butterfly (gravel mine) has a tunnel of 300 feet and is pushing ahead steadily. A number of placer mines between Quincy and Spanish Ranch pay big when water can be had for mining purposes.

The Consigne mine at the mouth of Jamison creek has a tunnel in 500 feet and contract let for 1500 more. At this distance, 2000 feet, it is expected to strike the channel. It is owned by a Pittsburg, Pa., company, and their operations may be regarded solely in the light of prospecting. They have already in the past 10 years ex-

pended over \$60,000 in their venture in this district, with slight returns.

The Shenandoah quartz mine, located in the neighborhood of Rich Bar, east branch of Feather river, promises to become one of the best mines in the district. The proprietor, F. B. Whiting, has unlimited confidence in its future. From a pocket vein he informs me that he took a quantity of ore this season that yielded \$200 to the pond.

The Plumas Eureka mine and mill, Johnville, superintended by John Hoskins, seems to yield as good returns as ever. The company employ 215 men and average 4600 tons of ore crushing monthly.

Along the Jamison creek below Johnville the Italians operate 29 arastras in working over the tailings from the Eureka mill. They pay a royalty of \$1 per day for each arastra, and are said to be doing well. Some of these operators are known to have left for Italy recently with from \$10,000 to \$30,000 as the result of their labors here.

The Four Hills mine, closed down four years ago, has not resumed operations yet.

The Gold Lake mine, 10 miles south of Johnville, owned by the Gold Lake M. Co., of which M. Willoughby is president and W. B. Mathews is secretary, will undoubtedly prove excellent property. The prospects are so encouraging that the company are planning to erect a mill next spring.

Around Sierra City.

The mining enterprises around Sierra City, Sierra county, are generally in a prosperous condition, and the business-men of the town profess to be much encouraged by reason of the bright outlook for the next year. There are a number of new mines just about ready to start up, among which is the Boffalo Consolidated, eight miles south of the town. Mr. E. Bosch, the superintendent, states that he has over 1000 tons of ore on the dump. The mill machinery has been delivered, and a commodious boarding-house and blacksmith shop erected for use of the mine. The ledge throughout the mine averages over 15 feet. The ore is finely decomposed and carries coarse gold. Three tunnels have been started. No. 1 is in 350 feet; No. 2 is in 200 feet, and No. 3, south side of creek, 60 feet. The latter will be extended 500 feet, upon which Mr. Bosch thinks that the main body of rich ore will be tapped. The stock of this company is divided into 600,000 shares at \$1. Doubtless this property will prove a bonanza to the stockholders.

The California Consolidated Gold Mining Co. has a mine adjacent to the town, the ore of which assays an average of \$7 per ton. A. Schubert is president of the company and Alvin Fischer is the secretary. The ore yields coarse gold. Lack of available capital has retarded the operations of the company. Tunnel No. 1 is in 120 feet, and the second tunnel just commenced. The vein is from 15 inches to 2 feet wide. Considering the quality of the ore and the convenience of the location, it is difficult to conclude otherwise than that this property will also eventually rank with the rich investments in mining enterprises.

The Morris Concentrating Apparatus.

The Margarite mine is now under the efficient management of Frederick Morris, the inventor and patentee of the Morris concentrating apparatus. It is the intention to have everything ready to begin active mining operations at an early day. New machinery has been introduced and placed in order. I was much interested in Mr. Morris' concentrating apparatus. He has received many high testimonials from the leading mining-men throughout the coast. By this process gold can be concentrated from the sulphurets with one operation by finely crushing the ore. Mr. Morris took a contract from the Excelsior M. Co., Meadow Lake district, some time since, to extract 73 per cent of gold from base sulphureted ore, and succeeded in working it up to 97 per cent without roasting, simply by ordinary milling. This process is adopted by the Young America below their mill. It has been adopted in three mills of Amador county, and since the fact has become known of its extraordinary success, Mr. Morris has received applications from numerous quarters, even so far away as Butte, M. T.

The Young America.

The fame of the Young America is now too well established to require special mention. I was informed by Mr. A. C. Busch, the superintendent, that there was actually enough ore in sight to keep the mill employed day and night for the next 15 years. The company runs three eight-hour shifts, furnishing employment to over 150 men. The wages paid are \$2 per day and board. The mill is a 40-stamp. Tunnel No. 4 has been lately started with the intention of doing away with the tramway. It is expected to strike the vein at a depth of 2300 feet from summit. Ingersoll drills are employed in the prosecution of the work.

The Sierra Butte mine, Thos. Preston superintendent, employs the usual large force of men with about the same results as the preceding season.

The Downieville Mining District.

Once so famous for its placers, seems likely to loom up in the not far distant future as a rich quartz region. Through the courtesy of Dr. Biher I was furnished a saddle-horse and accompanied him up the old Sacramento stage-road to the top of Mt. Vernon Hill, altitude 6400 feet above the sea. From this eminence the doctor pointed out all the noted landmarks

in every direction, and recited the history, or perhaps the traditions, connected therewith, with which he seemed perfectly familiar. Space forbids a recapitulation of the interesting notes taken on that occasion.

The Oxford mine prospects well. This is an old mine situated one mile north of Downieville, and superintended by H. H. Purdy. The company under a new incorporation have commenced a tunnel 300 feet below the old tunnel, and are in hopes of striking the ledge within 50 feet. The ore in the upper works averaged from \$12 to \$20 per ton.

The Homestake, five miles south, S. Spencer superintendent, is ready to begin operations. The quartz is of a high grade. The mill has eight stamps, and ten men are employed about the works.

Good prospects are reported from the Hog Canyon district; 25 pounds average rock taken from the Superior yielded \$3.65. So says Geo. McGee, the proprietor.

There are also some paying placer mines still around Downieville. The best gravel mine that came under my observation was the Wide Awake, nine miles north. In fact it was freely acknowledged as the best mine of the kind in the country. It is located in a comparatively new district. The company employs 13 men and the work is superintended by John Wilsdorf. Active operations were only started two years ago, though the company has been incorporated for the past four years. The capital stock is divided into 24,000 shares, originally estimated at \$1, but at present, so profitable has the investment proved, the shares are worth \$4 each. The ore yields \$4 75 per carload. The heaviest shareholders are residents of Downieville.

Nevada City.

Few places of note show stronger evidences of the lively times that have been, but long since departed, than Nevada City, Nevada county. We do not have to look far for the cause. It has in the past been practically a placer and hydraulic camp, and since the former has played out and the latter prohibited by law, its great dependence is gone. It must now eke out an existence in the best way possible. Nevada City still has the county seat, which is some help, but not sufficient to keep it up. There are a few quartz mines near by, but they do not seem to be doing much. It is to be hoped that some rich discovery will yet reward the persevering efforts of the prospector in this locality, and revive business once more. The old Mexican veteran, Capt. J. D. Flemming, one of the sturdy pioneers of '50, in partnership with Jos. Floyd, has lately commenced the opening of the Hard Tunnel mine at a new point. An attempt to open this ledge was made in '51, but owing to the hardness of the rock the experiment was abandoned, but from this circumstance the mine took its name, Hard Tunnel. Hoisting works, once located on this vein, near the present depot site, were accidentally burned down in '59. Many old friends would be glad to hear of the captain's good fortune.

Grass Valley

Has several mines that rank as old and reliable standbys; as for instance the Idaho, Empire and North Star. The former, superintended by E. Coleman, still pays its usual large dividends. The Empire, G. W. Starr, superintendent, is forging ahead as of yore, giving employment to 150 men, and furnishing satisfactory evidence that the ledge will hold out for a number of years yet. It is seldom that an employee of a mining company (or in fact of any other company) can assert truthfully that he has served in the same capacity continuously one company for 24 years. Such a man, however, is Matthew Provines, the amalgamator at this mine. He has served under eight different administrations, among whom were the well-known Capt. Lee and Jim Wilcox. Mr. Provines' wages at this mine have amounted to \$35,000 during the quarter of a century.

The North Star mine, Emile R. Abadie, superintendent, employs 200 men at present. The average assay of the ore now being taken out is estimated at from \$15 to \$25 per ton.

The Pittsburg mine, situated three miles north of Grass Valley, was formerly known as the Wigham mine, and was first worked in '52. The treasure taken from it first and last would foot up into several hundred thousand dollars. The mine was purchased by the present owners (an English company), last June, and is now being supplied with new machinery of the most improved order. Under the superintendence of M. L. Elliot, a new 10 stamp mill is being erected, and when completed, it is believed, will rank with the first on the coast. One thousand-pound stamps, Frue concentrators, sectional Blake crushers, and 200 square feet of new plates will be employed in the construction of the mill. Only 20 men are at present employed, but the force will be increased soon. They are doing development work at present. The ore that is preserved assays from \$15 to \$30 per ton. The shaft has been sunk to a depth of 1020 feet.

The Rock Bar mine on New York hill, two miles south of town, just between the Massachusetts mine and the North Star, has hoisting works on the south shaft, which is now down 500 feet.

The Chavanne shaft (same ledge) is down about the same depth. The chief owner and superintendent, Mr. H. Sylvestre, employs 15 men, and regards his present operations as merely development work and is very well satisfied that the ore taken out fully pays all run-

ning expenses. The Rock Bar mine embraces the Ford and Mellen claims, well known in earlier days as exceedingly rich; \$300,000 having been taken from about 300 square feet. Altogether Mr. Sylvestre reckons that at least one and a half millions have been extracted from this mine. Six years ago the present company took out \$20,000 in less than five days from a space of 20x30 feet. The average assay of rock taken out at present yields \$35—45 per cent sulphurets.

The Maryland property, adjoining the Idaho, which latter has paid such large dividends for many years, is highly spoken of by expert miners. For hundreds of feet the Idaho company has worked the ledge up to the Maryland line, and the fact that the Idaho produces \$600,000 a year is sufficient to indicate the character of the ore. There is insight in the Maryland mine, viewing it from the Idaho workings, enough ore to keep a 40-stamp mill running day and night for 20 years. Mr. S. P. Dorsey, the owner of this property, is satisfied that it is a good thing to have, and would not exchange it for less than a million dollars.

Not the least worthy of notice are the iron mines in the west end of this county. Mr. M. C. Taylor, the owner of 4500 feet of a 60 foot ledge, estimates that there is enough ore in the vein to run a 25-ton furnace for 30 years. It is a red and brown hematite and averages 60 per cent iron. These mines will doubtless in future prove a source of great wealth to Nevada county. F. B. L.

Bodie Tunnel.

EDITORS PRESS:—A few weeks ago I had the opportunity of making an experimental run with ore from the Bodie Tunnel mine, the results of which were so satisfactory that I publish them for the benefit of the stockholders of the company.

If reports are true as to the quantity of ore in the mine, there is no reason why the company could not begin to pay small dividends which could be increased by enlarging the crushing capacity of the mill. The property has been idle for a long time and probably the stockholders have long ago given up the hope of ever seeing any return for their investment. Instead of being a legitimate mining enterprise it has become an assessment property subject to the fluctuations of the stock-board. Prominent millmen have made several attempts to work the ore, but their efforts resulted in signal failure, whereas, had they been less conservative they would have been successful. The experimental run was made at the miner's mill which had been leased by the Standard Co. for the purpose of making experiments with the "Brewster Centrifugal Amalgamator." I made very exhaustive tests with this machine and found that it possesses none of the merits claimed for it. It is not a concentrator; it does lose quicksilver; and the pulp does not pass through the quicksilver. It possesses no advantage over copper plates, but the disadvantage of costing more and requiring power to run it. As I had unusual facilities for testing this machine, I will publish the results at an early date.

Bodie-Tunnel ore contains some coarse gold which would be saved in the battery; but this was not allowed for in the following results. The average of many assays indicates that the ore marked was of poorer grade than the average in the mine.

The ore was crushed through a No. 40 steel-wire cloth, the pulp run over amalgamated copper plates and the tailings amalgamated by charges in pans, with the addition of one pound of bluestone and 2½ pounds of salt to the charge. Amount of ore worked, 29 tons; less 8.7 per cent moisture, 26 48 tons; value of ore per ton, \$8.22.

Bullion Results.

Value of bar obtained from copper plates, \$148 31; extraction=\$5.60 per ton, or 68.1 per cent; value of bar obtained from pan amalgamation of tailings from copper plates, \$47.88; extraction=\$1 81 per ton, or 22 per cent; total extraction=\$7.41 per ton, or 90.1 per cent.

The copper plates were too short and I think that by repeating the experiment with longer ones the plate extraction could be increased to 75 per cent. I have no doubt that the extraction could be further increased from five to ten per cent by passing the tailings from the plates over suitable concentrators such as the Frue or Triumph, thus doing away with expensive pan amalgamation.

Cost of working 30 tons of ore per day at the Bodie Tunnel mill, using copper plates and concentrators, would be approximately as follows: Labor 2 engineers at \$5, \$10; 2 battery feeders at \$4, \$8; 2 concentrators at \$4, \$8, \$26; fuel, 4½ cords at \$10, \$45; castings, lubricants, etc., at 50 cts. per ton, \$15; contingent expenses, \$4; total, \$90. Cost of milling per ton, \$3.

By increasing the crushing capacity of the mill, the cost of milling would be reduced.

The theory has been advanced that ore from the Bodie district could not be concentrated, but several months' experience has convinced me to the contrary. If such companies as the Standard and Bodie Tunnel would discard their expensive pans and introduce copper plates and concentrators, the cost of milling would be much reduced, the extraction increased, and new life infused into what is now a dead mining camp.

Geo. J. ROCKWELL,
Lste Mill Supt, Standard M. Co.
San Francisco, Nov. 26, 1888.

The Lixivation of Silver Ores with Hyposulphite Solutions.

NUMBER 2.

EDITORS PRESS:—Continuing my examination of Mr. Stetefeldt's book, I note that on page 75, comparing the economy of sodium and calcium polysulphide, the author, after showing that, as is well known, thiosulphate is formed in making the polysulphides, says: "A solution of calcium hypsulphite, on the contrary, decomposes rapidly into gypsum and sulphur if heated above 60° C. or 140° F." This he supposes to involve a loss of sulphur which does not occur in making the sodium compound, owing to the greater stability of sodium thiosulphate, which remains intact to reinforce the stock hypo, as metallurgists have supposed to be the case also with calcium. He goes on to say: "From this it follows that, in preparing the calcium solution, most of the calcium hypsulphite formed is again decomposed, and that in its place calcium sulphate is obtained." Here is a doable error: In the first place, when calcium thiosulphate in aqueous solution is decomposed by heat, not sulphate is formed, but sulphite. In the second place, the decomposition does not occur in presence of a strong solution of polysulphide. Freshly made solution of calcium polysulphide contains a large proportion of hypo, and the quantity does not diminish, but increases by continued boiling.

I took two equal volumes of calcium polysulphide solution; the one was immediately decomposed by a solution of zinc sulphate, filtered, and the precipitates well washed, with the aid of the filter pump; a portion of the filtrate corresponding to 1 c. c. of the original liquid contained a quantity of thiosulphate represented by 28. The other was boiled for an hour, then treated in the same way as the first. It contained a quantity of thiosulphate represented by 30 for each c. c. of the original liquid. Other experiments confirmed these results. Thus another portion of the "sound basis" crumbles away, and one of the objections recently raised against the Kiss process falls to the ground, while practical metallurgists, who well know that they rarely have occasion for reinforcement of their hypo, are vindicated in the belief in which they have worked.

It is true, nevertheless, that calcium involves the use, not necessarily the loss, of a larger quantity of sulphur than where sodium is employed. In either case there is always free sulphur in the precipitate, and there are three ways in which that sulphur may be recovered: Firstly, where good lime can be got by boiling the precipitate with milk of lime; secondly, by boiling it with caustic-soda solution; in these cases polysulphide is recovered; thirdly, by warming it in solution of sodium sulphite, which dissolves the sulphur and forms hypo. The figures given on page 86, showing a consumption of 21.6 pounds of lime and 9.3 pounds of sulphur per ton of ore, as against 4.4 and 2.9 pounds of soda and sulphur per ton of similar ore, are the veriest claptrap, more worthy of a quack medicine advertisement than of a serious treatise. If true, they only show the extremely bad quality of the lime, the poor quality of the work, or both together. I am disposed in favor of sodium sulphide, where it is not too expensive; but such arguments as these are worse than hugging the question.

Speaking of neutralizing caustic in the (sodium) hypo by means of sodium bicarbonate, on page 27, the author says: "Besides, it is not practicable to perceive * * whether the caustic is neutralized or not, since the reagent itself has an alkaline reaction. Hence the bicarbonate has to be added at random." In the next paragraph he goes on to say: "If the lixiviation solution contains calcium, derived either from caustic lime or calcium sulphate in the ore, or from using calcium sulphide as precipitant, it becomes possible to ascertain the end of the reaction. From a sufficiently diluted solution, sodium bicarbonate does not precipitate calcium, the bicarbonate of the latter element being soluble in water. If, however, caustic soda is present, which converts the sodium bicarbonate into the neutral salt, calcium carbonate will be precipitated as long as caustic soda remains to be neutralized."

Now, if this is true (and it is), why must the bicarbonate be added at random? What is easier than, by the aid of a solution of calcium chloride, to make an assay of the stock hypo, showing the exact proportion of bicarbonate required? or, in a similar manner, a qualitative test may be made at any time during the progress of the neutralizing, showing whether or not it is completed.

But on page 33 we are informed, no doubt correctly, that "caustic lime dissolves in sodium hypsulphite solution, a double salt of sodium and calcium hypsulphite and free caustic soda being formed." Hence, then, if the caustic soda in the hypo is produced by lime, from whatever source, the soda and lime are present in equivalent proportions, and all that is necessary is to add the bicarbonate as long as it causes a precipitate. If, however, the caustic comes from sodium polysulphide being used as precipitant, the test with calcium chloride may be resorted to.

This brings me to a consideration of the probability of the hypo becoming caustic from the use of calcium polysulphide. I have taken solution of the calcium salt and added zinc sulphate solution; in every trial, all alkalinity that could be detected by litmus paper disap-

peared as soon as the polysulphide was decomposed. The same result was obtained when the sulphide solution had been reboiled with freshly slaked lime, and the same when, instead of zinc sulphate, sodium-cuprous thiosulphate, neutralized with potassium hydrate, was used. All of these experiments, however, seemed open to cavil, if not to positive objection. I therefore made a strong solution of silver in sodium hypo, and, dividing it into two parts, precipitated the silver from the one by ordinary calcium polysulphide, and from the other by that which had been reboiled with slaked lime. In neither case did the liquid show alkalinity to litmus or turmeric paper. I conclude that it is very doubtful, to say the least, if the hypo ever becomes caustic from the use of calcium sulphide. This is a point in favor of the Kiss process, and it helps to account for the fact that workers of that process have seldom been troubled with caustic in their solutions, which seems to be such a bugbear to the Russell process folk.

In working the Kiss process, however, as generally conducted at least, there is always a possibility of the hypo becoming caustic if the ore is calcareous, for even though calcium hydrate may be insoluble in calcium hypo, yet there is usually some sodium salt present, from the fact that the work is always commenced with sodium hypo, and it must take a long time to work all of that out, to say nothing of an occasional reinforcement of the hypo by an addition of sodium thiosulphate, and the possibility of the roasting salt not being entirely removed by the washing. In my next I may have something to say about different methods of neutralizing a caustic hypo and some other matters.

I think I have shown that he who would study the theory and practice of leaching silver ores will do well to take the book in question *cum grano salis*. As to the practice, from the Russell point of view at least, Mr. Daggett has generously given it to the world free of charge, and this being the case, that gentleman is excusable if he has allowed his book to assume somewhat of an *ex-parte* character.

I cannot, however, quite understand why the promoters of Russell's modifications insist so strongly on applying them to the Patena process only. I think this produces a prejudice in the minds of some, and I have no doubt many people have an impression that Russell's improvements cannot be applied to the Kiss process; this is wrong, except in the matter of precipitating lead by sodium carbonate, which is not always necessary or desirable. Or is it that the cases are so few in which, with good roasting, and the use of calcium polysulphide, thus avoiding causticity, unless in case of a calcareous ore, the Russell process offers sufficient advantages to offset the increased trouble and expense?

C. H. AARON.

The New Source for Chlorine Gas.

A Hint for California Salt Manufacturers.

At the meeting of the California Academy of Sciences of Nov. 19th, Mr. T. Gutzkow spoke on the proper manner of making Sorel's cement or magnesium oxychloride produced by mixing calcined magnesite with a solution of magnesium chloride. He pointed out that this cement is the only substitute for plaster of paris yet discovered which equals it in whiteness and delicacy of imprints and surpasses it greatly in hardness, compactness and resistance against water. At the present time, however, this magnesium oxychloride is also in another respect of great interest, to wit, as a source of chlorine gas. Mr. Gutzkow referred to that point in his lecture as follows:

Interest in chemical industry is, for obvious reasons, so small on this coast, that many members will learn for the first time that for about 10 years a fierce war has been raging in that important source of English prosperity, the alkali trade; that is, the soda manufacture. At that time there appeared on English soil as a foreign importation a neglected child of England, the ammonia-soda process, invented in 1836 by John Thom of Manchester, and boldly challenged the old Leblanc soda process for competition. The competitor, at first contemptuously received, became soon a dangerous rival, with very strong chances for final victory. While the ammonia process starts from a saturated solution of salt, and uses only limestone as second material, the ammonia being used over and over again, the Leblanc process requires the dry salt, and in addition to limestone, sulphuric acid, obtaining as a by-product muriatic acid, which costs 36 per cent of the whole process.

As a stronghold of the old process unassailable by the new one, it was formerly considered that the ammonia-soda process did not furnish material for making chlorine for bleaching powder. This substance is the most important by-product of the Leblanc process and is manufactured in England every year to the value of \$5,000,000, of which the larger half is exported. England has nearly a monopoly on that compound since Weldon, in inventing the well-known process of reviving manganese, made England independent of that mineral, previously imported from abroad. For some years English soda manufacturers have derived no profit from the sale of their soda and look for the income to bleaching powder, a "trust" in that material having been formed.

Now, there occurred a memorable event in the history of chemistry at the end of last year, namely, at the December meeting of the London section of the English Society for Chemical In-

dustry, the president of the society, Prof. Dewar of Cambridge, read a paper which gave the results of working at a large scale at Salindres, in Southern France, on the establishment of Mr. Perhiney, a new process for obtaining chlorine. This process consists in passing, at a red heat, a current of air through the very substance I have been speaking about, that is, through magnesium oxychloride. The results were highly favorable, with all prospects that they will be improved. They could not be doubted, for Prof. Dewar, who is a chemist of the highest standing in England, had personally and closely watched the process at Salindres. Mr. Perhiney himself is a man of national reputation in France, and his apparatus have commanded the admiration of all chemists.

The magnesium oxychloride is prepared by dissolving magnesite in muriatic acid, mixing this solution with magnesite, drying the cement at 300° C. to free it from water, and dumping it into an oven. This oven consists of nine chambers, each nine feet high, three feet long, and three inches wide, and is heated by gaseous fuel. When the required temperature has been reached, the whole gas generator plant, which rests on wheels, is moved away slightly so that the oven may be closed by hinged doors; an exhaustor is set in motion and a current of air drawn through the oxychloride, which, having absorbed the heat from the brick walls of the furnace, has become red hot. The gases cooled are first muriatic acid and then chlorine. The former is condensed in a much-adorned chamber by glass tubes, through which water passes and the chlorine conducted to the lime-absorbers. The residue in the oven is magnesite, which is again used with the condensed muriatic acid and with a certain amount of fresh acid for making the oxychloride. Thus the muriatic acid yields 80 per cent of its chlorine, while by the old Weldon process it has not been possible to utilize more than 33 per cent of it.

This would of itself be a great advantage, but there is still another circumstance to be considered, much more in favor of the new process. This is, that no muriatic acid is required. It is intended to employ—and there is no doubt that this is feasible—the concentrated solution of magnesium chloride which Mr. Perhiney obtains as a heretofore valueless by-product from his large sea-salt works, situated at the mouth of the Rhone, the largest works of that kind in existence.

I have given a description of these celebrated works in one of the late numbers of the Transactions of the Technical Society of this city. I have stated in that paper that the conditions for salt-making are much more favorable in California than in France; that even now the yield of salt per acre is much larger here than there, and could be made fully twice as much if our salt-makers would adopt the much cheaper French method. There is now running into the bay every year about 20,000 tons of dry magnesium chloride in 3,000,000 cubic feet of hibern, nearly enough to make all the bleaching powder exported from England. Nor is there any limit to the quantity we may produce. Neither the concentrated solution of salt for soda-making by the ammonia process nor the solution of magnesium chloride for chlorine-making by the Perhiney process will cost much more than the interest on the capital invested in making the levees.

It was prophesied a number of years ago by an eminent English chemist that if certain chemical reactions could be made to work practically, the center of the so-called grand chemical industry would move from the neighborhood of cheap coal to the neighborhood of cheap solutions of salt. The success of the ammonia process and of this new chlorine process makes it probable that the prediction will soon be verified, and California may expect at some future day—perhaps not in the very near future—to be able to compete successfully in an industry for which she heretofore seemed to possess very slim chances.

Geology of Utah Coal-Fields.

Concerning the Pleasant Valley coal country, Utah, a representative of the Salt Lake Tribune has interviewed Marcus E. Jones about his explorations.

While there he noticed traces of an ancient Cretaceous lake existing ages prior to Lake Bonneville and having a probable connection with the Gulf of California, although no traces of such connection have yet been found. This entire region in those primeval times being about sea level, the Cretaceous sea was no doubt salt like ocean water, and it was not until long after that the upheavals came which finally sent our section of the country up to its present elevation. This Cretaceous lake or inland sea extended from Coalville around through South-eastern Wyoming to Twin Creeks; thence due east into Colorado, and south along the western base of the Rocky mountains into New Mexico and Arizona along the line of the A. & P. R. R. Thence the line followed the north base of the Mogollon mountains into Western Arizona near the San Francisco mountains; and thence due north into Utah, striking the Wasatch mountains, above Silver Reef. The shore line continued over into San Pete valley, and to Thistle, running thence due east, and following the Uintah mountains 200 miles, ran back to Coalville. The area of this Cretaceous sea must have been 75,000 square miles. Its shores from 10 to 15 miles out were very shallow, and composed almost entirely of marl several thou-

sand feet deep. On these shores enormous masses of vegetation accumulated, forming finally beds of peat; and as the shores gradually sank under the water the vast vegetable deposits gradually became the coal measures for which this inter-mountain country is now famous. The sunken marshes became in time covered with 2000 or 3000 feet of sandstone and shale, the shale-beds being impregnated with vegetable matter now found as asphaltum above the coal-beds. Then came the Tertiary upheaval, raising the Cretaceous formation 4000 feet above the sea. This left a depression in the original sea one-fifth its original size, which was occupied by a probably fresh Tertiary lake. This lake was very deep. Its area was about 15,000 square miles, and extended as far north as the west end of the Uintahs, as far south as Arizona, east beyond Grand Junction, and west ten miles this side of Price. So the desert now traversed by the Rio Grande Western is a large part of the bed of this ancient Tertiary lake, but the soil is poor because the lake-bed was almost entirely of clay. But cultivation can in time break this clay up and make it quite passable, while the planting of trees will keep the temperature down, thus preventing the air from becoming saturated with moisture and being precipitated in waterpots by contact with the Cretaceous bluffs. The Tertiary lake heavily washed the shores of the Cretaceous rocks in that rainy, tempestuous period, tearing, wearing, boring them into all sorts of shapes, so that they now stand in some places over 2000 feet high in walls, battlements, canyons, gorges, gulches and gullies. Passengers along the Rio Grande road see wonderful evidences of this. The action of the water in this age exposed the great coal deposits now cropping out everywhere in Eastern Utah. The Tertiary lake was gradually elevated and drained, forming the canyon of the Colorado and leaving Dry Castle valley, Green river valley, and the valley of the Gunnison. Since then, the rivers and streams there have worn away these beds so that nothing remains there of the old Tertiary sea-bed except isolated mesas.

The great coal-beds formed a little below the middle of the Cretaceous period were left exposed in the faces of the great cliffs for hundreds of miles along the shores of the Tertiary sea, and in about every canyon and promontory the veins were sticking out. There are only two well-marked coal-beds in Utah, and these extend the length of the Territory, being exposed in places nearly all the way. In Southern Utah, near the iron mines, they run 37 per cent in fixed carbon—that is, carbon that won't volatilize at a red heat. The coal also crops out extensively west of Price, at Pleasant Valley, San Pete, and other places. The San Pete coal runs as high as 52 per cent in fixed carbon. The Fairview (P. V.) coal runs from 47 to 49 per cent. At Castle Gate the six-foot vein of the Ogden Coal Co. runs 52 per cent, with three per cent ash, and the 14-foot vein of the P. V. Co., six miles south of there, is about the same. The P. V. mines' management say they will make a fair coke to do for ordinary purposes. Crested Butte coal has 67 per cent of fixed carbon, but Prof. Jones is confident that anthracite will yet be found in Eastern Utah and at the surface, and this will have 85 per cent of fixed carbon. The higher this percentage, the greater the coal's value for smelting. The Sunnyside coal is of the same vein as the Ogden and P. V. companies at Castle Gate; it assays 52 per cent fixed carbon, and is as valuable as any other coal of the same nature, but the miners there find it inconvenient to haul ten miles from the railroad track.

There is evidence of the precious metals in the old Tertiary sea-bed, and this bed will yet reveal the remains of exceedingly interesting mammals of that age. North of the Uintahs there was an inland sea almost as large as the Tertiary sea and contemporary with it, occupying the region between Evanston and east of Green River, going as far north nearly as Fossil station on the Oregon Short Line, and washing the Uintah shores on the south. In the bed of that sea, Professors Marsh, Cope and Sydney have found the most interesting fossils ever discovered in North America; remains of gigantic tigers, elephants, alou, bears, cattle, monkeys, camels, and horses of one, two and three toes. This northern sea covered about 10,000 square miles of country.

ELECTRIC LIGHTS IN ICE.—A very novel and interesting exhibition was made at the late exposition in Cincinnati. The exhibition was an incandescent electric light frozen in ice. The process of freezing was performed in the presence of visitors, and while the process was going on various colored aniline dyes were thrown upon the ice and the most beautiful effects in color and formations produced, and then there was the glass bulb that we are all so familiar with, with its filmy trace of wire, upon which the electric current flashed and glowed at the will of the operator. Of course some heat is generated by the light, and to think of freezing it in a solid chunk of ice and not cracking the glass, and the electric light working successfully, seems more like a miracle than a human accomplishment. It attracted great attention.

ANACONDA real estate, and mines in the vicinity of Anaconda, M. T., are in great demand now. The city has now 6000 inhabitants.

MORE than 1000 men are now employed on the Oregon Pacific road above Tehama.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH CONSOLIDATED.—*Ledger*, Dec. 1: They are still hoisting water from the Pacific shaft, employing only one shift per day. The water has been lowered to the 1,400-foot level; but there yet remains over 300 feet of water to take out; and considering the vast chambers which have been stowed out below the water-level, unless something is done to facilitate the present method of drainage, it will be a long time yet before the bottom of the shaft is reached. The two tanks which are used in hoisting water hold 500 gallons each. As far as the water has been lowered the shaft has been found comparatively uninjured—in fact much less damaged than was expected. This week, however, in one of the compartments the tank seemed to meet with some obstacle, and occasionally came up only partially filled. The reason for this is thought to be that the timbers have pinched or come together, contracting the shaft so that the opening is not sufficient to enable the tank to descend. Nothing has been done toward exploring the mine at the point where the fire started. The other shafts remain closed, and this prevents the circulation of air, so that in its present condition the air in the levels is too foul to admit of any investigation. As to the damage caused by the caving of the stopes, owing to their being under water so long, nothing, of course, can be known at present. But, considering the fact that the men were driven from the mine before the least precautions could be taken against possible damage from flooding, it is more than probable that extensive caves have occurred, which will involve an immense amount of labor before the mine can be got into working shape again. Why the drainage of the mine progresses so slowly, and why the work is not prosecuted night and day without intermission, is a mystery. There is, no doubt, some cause for it. Two causes have been hinted at—one, to await the action of the annual meeting of stockholders; another, to affect the price of stock on the New York market. Whether either of these is the true explanation of the situation we are unable to say.

NORTH STAR.—The North Star continues to look well. They are drifting alongside the vein, and have not broken into it this week.

NEW LONDON.—*Amador Ledger*, Nov. 29: Mr. John Ballard, one of the owners in the New London mine, was in Jackson Wednesday. He and his partner, Mr. Martin, have expended over \$100,000 in developing the New London, without crushing a pound of rock or taking out a dollar. They have a two-compartment shaft 1230 feet deep, and 2000 feet of levels in their mine. They are now taking out fine milling ore from a 12-foot ledge in their north level, the deepest one in the mine. This rock is taken from a point 100 feet from the shaft and about 1000 from the north boundary of the mine. All through it is the best rock yet found in the mine, although they have high-grade ore in a number of other places in the mine. The company expects to put up a large mill in the spring.

SUTTER CREEK G. M.—We gain the following from the superintendent: The 10-stamp mill resumed operations on Nov. 22. For the week ending Nov. 28th, have milled 90 tons of ore. At present they are not breaking any ore in the mine, as several hundred tons have been stored away. The Cosmopolitan is in 55 feet in its crosscut east, and the ground continues hard. They don't expect to cut the ledge before they are in 80 feet. The North California put on four men Monday. They have eight men now, and are drifting north and crosscutting east. They will have their mill ready in another week. The Gover is running their mill steadily now and have plenty of water. Their reservoir has been finished by the contractor, Mr. A. B. Summers, and turned over to the company. The Pacific Con. Mining Co. have put on another shift and are running night and day.

KENNEDY.—This mine is now among the permanent institutions of the county, being down about 1100 feet. The 40-stamp mill is now running its full capacity on rock from the 1050-foot and 700-levels, the last cleanup being the best since the erection of the new mill. The north shaft is now down about 750 feet, and will be sunk to the depth of the south shaft—1100 feet—as rapidly as possible. The motive-power for both mill and hoisting works is water from the Amador canal. At the north shaft they are putting in a boiler so as to run by steam should the water supply freeze up during coning winter.

REED & ASKEY.—A rich strike was made in the face of the tunnel running north, last week. The ledge is four feet wide and will mill \$30 per ton in free gold. The owners have just erected a new 10-stamp mill, which is to be run by water-power.

MCKENZIE.—At this property, near Irishtown, they have just put in three Frue concentrators at the mill and expect to start crushing at once.

KENNEDY.—*Amador Ledger*, Nov. 24: This mine is moving along prosperously, giving every indication of a valuable and permanent mine. The mill is kept running steadily at its full capacity of 40 stamps. It is supplied with ore extracted from the lowest level just opened at 1050 feet, hoisted through the main or south shaft, and also with rock from the 700-foot level from the north shaft. From both points, the rock taken out is looking remarkably well. The cleanup last month was one of the best ever made since the mine resumed operations.

PLYMOUTH CON. MINING CO.—The work of opening the mine progresses steadily. The superintendent, E. L. Montgomery, writes to the New York office as follows: "We are gradually lowering the water; it is now a foot below No. 3 tunnel (which is 1237 feet down). So far everything appears to be in good order and the work goes on without mishap. We hope in the near future to have the old mine open again. The circulation of air through the south shaft is not very strong yet, but as we get the water down it will increase."

NEW LONDON.—At this mine near Plymouth, at the depth of 1200 feet, in the south drift, a large body of fine quartz was struck last Thursday. The size of the ledge is variously given from 8 to 12 feet thick. As to the quality of the rock we have received no definite information except that parcels sent to San Francisco for assay yielded over \$200 per ton.

This is by far the most important development made in this mine.

ALPI MINE.—An effort is being made to start this claim, which is located two miles south of Jackson. The croppings indicate an immense quartz ledge. A shaft has been sunk 50 feet, and to this depth the ledge shows as strong as the surface indications. It is owned by W. F. Detert and others. W. T. Robinson has secured a bond of the property for two years.

El Dorado.

BOBBY BURNS.—*Placerville Observer*, Nov. 27: The Bobby Burns mine, seven miles east of the town, has a shaft down 50 feet and a level run south about 30 feet. The ledge is from three to five feet in width, showing free gold in every pound of ore taken out. This mine was partially opened 26 years ago. The owners, Blair brothers, Tom Stephens and Tom Alderson, thought so favorably of the mine, even in those early days, that they procured a patent for it. About two months ago they commenced work, and with two men have sunk 50 feet and run a level 30 feet, showing that the ground is easily worked.

Mono.

SMELTERS AT WORK.—*Homer Mining Index*, Nov. 27: The Star M. and Reduction Co. is composed of capitalists from Montana, who have erected suitable buildings and machinery with sufficient capacity to reduce 150 tons of ore daily. The company's mine is located at North Fork, south of Homer district, in an immense basin immediately under the pinnacle of Mount Raymond, at an elevation of about 8500 feet above sea level. The sides of the basin rise precipitously, affording great facilities for attacking the lode by quarrying to a considerable depth below the croppings. The ore is argilliferous galena, averaging 20 per cent lead and 22 ounces of silver. On the middle of the principal outcrop ore is being extracted by means of an open cut 40 feet wide, which shows a bank of ore 20 feet high, and in places streaks of pure galena several feet thick. The ore is apparently richer for 10 or 12 feet proximate to the walls, but is generally diffused throughout the whole vein, which is fully 100 feet in width. The company has gone to work in real earnest, and being composed of practical men, with adequate means for actively prosecuting the work in hand, will undoubtedly make a success of the venture, and thus attract still more the attention of capital to the varied mineral resources of these hills.

THE DREADNAUGHT.—Thomas J. Agnew came over from his Dreadnaught mine last week, where he has been doing assessment work. This mine is located on the ridge about a mile and a half north from the east end of Lundy lake, in the second or more westerly belt of limestone which crosses this canyon at a right angle. There is an immense body of galena ore in it that will yield, by smelting process, not less than \$20 and as high as \$35 per ton, standing at a fair average of \$30. A shaft 80 feet in depth is all the way in ore, and numerous open cuts on the surface show good smelting material in all directions. For a distance of 160 feet by the tape-line, there is an unbroken mass of galena. In other places along the location the mineral lies in kidneys and hunches of varying dimensions.

ABANDONED LOCATIONS.—*Homer Mining Index*, Nov. 27: Now that there is a good prospect of the camp becoming a little more active next spring, old residents are scratching together their recollections concerning locations that were abandoned in the earlier days of the district, when greedy prospectors were satisfied with scarcely less than mortar rock. Many of those old claims showed up well and will doubtless be looked after again. The records, preserved only in the files of the *Index*, show that scores of ledges remain to be rediscovered and claimed. Many of them, which at that time were considered too low-grade to conform to the expectations of a Mill creek millionaire, were, in fact, really good prospects, and will not be permitted to lie fallow much longer.

CLEANUP.—The Pierce mill cleaned up last Monday, after a good run on May Lundy ore, which will probably be the last of the season. The result was a large wad of gold, which would be a good winter's stake for several men and their friends. The ore averaged \$130 per ton, which in some camps would be considered "fair to middling."

Nevada.

THE NORTH BANNER.—*Nevada Transcript*, Nov. 29: The pumping and hoisting machinery of the North Banner mine near this city, says the *Union*, was started up on Saturday and was found to work well. The machinery is set up in a station on the tunnel level, 1500 feet from its mouth, and water-power is conveyed to it by means of a pipe-line, which is laid through an upraise which was made through to the surface on the incline of the vein, and takes water from a large tank, which is supplied by a branch ditch of the South Yuba canal. The water from this pipe-line drives the Pelton wheels which do the pumping and hoisting, and the waste water then passes out through the tunnel and serves to run concentrators at the new mill which is situated below the mouth of the tunnel. The tunnel has been enlarged and straightened, and a track with I rails laid down, over which the cars with ore and waste will be run. The shaft is now 30 feet below the level of the tunnel, where the vein shows about three feet in width and carrying ore of high grade. Now that the machinery is in working order the sinking of the shaft will be resumed, and will be sunk about 90 feet, when a new level will be opened. There also yet remains a large quantity of ore in the stopes above the tunnel, much of which is no doubt of high grade, judging from the results heretofore obtained from it. The new mill, which has been undergoing construction at the same time the mine improvements were in progress, will be ready for crushing in a week or more, and will be a complete structure in its reducing and amalgamating facilities. The mill will have ten stamps and all of the best improvements for mill work. There are now 500 tons of ore ready for milling, and the supply will be added to as fast as possible.

AMERICAN-HILL QUARTZ.—*Transcript*, Nov. 29: Brodie and Wheeler have commenced to work a quartz ledge situated on American Hill, west of town. Some years since, Grover, Hirschman & Co. took out three crushings from the same ledge, which yielded, respectively, \$61, \$56 and \$36 per ton. Believing that where such rock was once found there must be more of the same kind, Messrs. Brodie and Wheeler have started to work. The original owners

found good pay gravel on the ground and left the quartz to work it, so the ledge has until now remained idle.

Placer.

THE RED POINT MINE.—*Placer Herald*, Dec. 1: This mine belongs to the French Co. and is about two miles above Damascus. This company owns a large area of mining ground on the divide and has bonded several claims besides. The discovery of this gravel deposit is due as much to surveying as to prospecting. The company made careful and elaborate surveys before breaking ground. The result of their prospecting has but confirmed the belief entertained by many miners that a rich and deep channel extends down the divide as far as Spring Garden, where it makes a sharp bend to the left and extends into El Dorado county. This channel may not be continuous, but there are good reasons for believing that it is. At any rate no developments so far made have demonstrated to the contrary. The tunnel was begun on the second day of August, 1886, and is 3349 feet in length. With the exception of the first hundred feet the tunnel was run by Burleigh drills. The height is six feet. The mouth of the tunnel is 70 feet higher than the Mountain Gate tunnel at Damascus. The tunnel is very dry and comfortable. The channel has been worked on both sides of the tunnel, but has paid better on the eastern or up-stream side than on the western. On the eastern side the average yield was \$3.70 to the car-load, and on the western \$2.35. This difference in the yield was caused by the channel widening as it followed down the divide, the width at the point worked being 650 feet. On the western side a block of ground 40x650 feet has been opened up. Owing to the scarcity of water the men have been kept at work blocking out the ground, so that when water comes a large force of men could be set at work running out gravel. Some 40 men have been employed at the mine in various capacities during the summer and fall. The gold is of a reddish cast, and is of fine quality, averaging 932 in fineness. The compressor works, store, boarding-house and office are located 800 feet below the crest of the ridge on Red Point, which looks as though it had slid out of the hillside and stopped just as it was about to fall over into the canyon. The mine is under the able management of Supt. C. F. Hoffman, who unites a practical knowledge of mining with the theoretical and scientific. The company has shown its great faith in the divide by purchasing and operating mines that had hardly been prospected. It has brought the means to open up a large section of ground that would not have been opened for years, and has turned the attention of mining men to the higher mining districts, and has shown them that the old river-beds of Placer offer greater inducements to investment than do the silver mines of the State of Nevada.

ON THE DIVIDE.—*Placer Argus*, Dec. 1: The channel at the Dardanelles has widened out and is yielding extra good pay. The prospects have brightened up during the week, so that a large force will be employed soon. The Swindle Hill claim is being worked with good prospects. Riley, Hoffman & Jewel have tunneled at the Last Hope on one of the bends in Brushy canyon. The location at the bend is fine, and the prospects are that they will have one of the best claims on the divide. Good pay has been taken out already. Some men are at work on the tailings from the Missouri claim in Devil's canyon. They are well pleased with the returns. The 20-stamp mill at the Mayflower is about finished, and is expected to start this week. The gravel in the mine is prospecting rich. A large force of men will be put on soon. F. Chappellet is going to start a tunnel on the Eureka, about four miles from the Red Point. The Gray Eagle men are hard at work putting up their heavy machinery. L. Remler says that there has never been a better outlook for the Divide than at present. All the mines have excellent prospects and are all on the point of putting on large forces. The miners all receive their pay regularly, and all kinds of business are on a solid basis. The Divide is booming without a doubt.

Shasta.

FROM WHISKYTOWN.—*Cor Shasta Courier*, Dec. 1: Geo. H. Knox, the veteran prospector, who has been working the old North Star mine on Grizzly Gulch, is being rewarded, as the mine shows up splendidly with good ore from which the filthy lucre protrudes in abundance. John Bauder and son are opening up a fine prospect on Whiskey creek, which we would not doubt be safe in predicting the coming bonanza of this section. J. M. Daugherty, of the Green & Co. mine on Mad Mule, reports the mine looking well. A. J. Woodward and Joseph Jones are surprising the neighborhood with a fine prospect and rich specimens.

GOLD.—*Shasta Courier*, Dec. 1: An old miner of 27 years' experience in this neighborhood predicts that the boss mines of Shasta county, for pocket, seam and quartz, will be found in less than five years between Spring creek and Salt creek. Spring, Rock, Middle and Salt creeks have been immensely rich in beds and bars of free gold, coarse and fine, and often mixed with quartz. Many of the flats and plateaus between have paid wonderfully well, and quartz ledges crop out by the hundred, and many more are hidden just beneath the surface by overwash and slides. That old miner is only one of many who holds to his opinion. The history of Bunker Hill mine shows that gold by the muleload is liable to be found in the district mentioned, and the Jarvis, and Engnm & Wright strike, the Hoey, Lowery, and other pockets are testimonials of what may be found in the territory alluded to.

COLEMAN.—Wm. T. Coleman came down from French Gulch Monday and went on to S. F. He has spent a month inspecting his Niagara mines and mills in French Gulch and Trinity, and is well satisfied and pleased with the mines and the way they are managed by his efficient superintendents and agents, chief among whom is John Sutherland of the Niagara.

MILL STARTED.—The rains having furnished sufficient water, five stamps on the Frank Wheeler mill at French Gulch have been started, and with more rain the mill and mine will be worked with full force.

ORE SHIPPING.—*Redding Free Press*, Nov. 27: Two years ago not a ton of ore was shipped from this county for smelting purposes, but since it has been discovered that there is considerable profit in the operation, mining men have turned their attention to its advantages, and the following mines are now shipping ore to San Francisco: Mammoth,

Texas and Georgia mines, Old Diggings, Nelly, Iron Mountain, Phoenix, Whiskytown, Snyder, Squaw Creek, and the Nason & Merrill, Sacramento river. It is to be hoped that the ore can be worked successfully in the county in the near future.

KENNETT ITEMS.—The Butters Ore Milling Works will start up about December 1st. Ore is now coming in. The Central mine shipped the first car of crushed ore to the works. Hart & Fleming of the Texas mine are now making preparations to ship to these works. Assays are coming in rapidly and the laboratory is now kept quite busy. The works have about 250 cords of wood in the yard. Fader is making rapid progress in the freighting of the Warner and the Carson & Snyder mills. Nearly all of the machinery for both mills is now on Squaw creek. The representative of the Sierra Buttes Co., who is examining the Uncle Sam mines, passed through Kennet Sunday. He seemed pleased with the outlook. The prospect for an active winter in mining is good. Outside capital is coming in, and Shasta county will be an active center of successful mining before two years have passed away.

THE OLD JOSEPHINE MINE.—Mrs. J. Lutz of Star gulch, who was in town on Tuesday, informs us that the Walker brothers are making things lively there, and are employing a large force of men in their operations. Their ten-stamp mill is being pushed rapidly to completion, and will be ready for starting up about the middle of next month. They have commenced a new tunnel into the hill near their headquarters, and are sanguine in their expectations of rich developments in the near future.

Siskiyou.

GRAVEL MINERS.—*Yreka Journal*, Nov. 28: The river miners on the Klamath are still at work with good success; the storms so far not interfering with operations, nor the weather cold enough to render the delving in the cuts dangerous. A heavy storm next month to flood the river may force them to pull out, or freezing weather will cause a suspension, owing to the frozen banks being dangerous, by caving, or boulders dropping, as the sun thaws in the daytime. The hydraulic miners in the various districts are making preparations for more extensive operations during the approaching winter, by laying more pipe of larger caliber, besides enlarging and improving the ditches to secure greater power for the giants. In the high gulch, or dry diggings, the miners are also fully prepared with piles of pay gravel for washing, and the dams and sluices are in good order for doing a rushing business when the storms come and while the water lasts after each storm.

Trinity.

BIG SLIDE.—*Journal*, Dec. 1: One night last week the timbers holding the waste dump at the Brown Bear mine gave way and let that immense quantity of debris down the gulch, covering up Frank & McDonald's lower tunnel so as to prevent work in it for several weeks. Mr. Roberts had been working in the tunnel up to midnight, but for some reason did not return that night after going to lunch, consequently there was no one in the tunnel when the slide occurred at about 2 o'clock A. M. It was very fortunate for Mr. Roberts, for if he had been buried in the tunnel it would have taken, at least calculation, from 24 to 48 hours to have liberated him from his underground quarters. We are informed that the company will not attempt to remove any of the slide, but will run a tunnel in the solid ground to tap the one now covered.

NEW RIVER.—F. J. Ladd, one of the owners of the Mountain Boomer quartz mine, New River, was in town this week and says that the camp is holding its own. There are some first-class mines there, but it will take time and money to develop them. He has every confidence in the future of the district.

Tulare.

SILVER.—*Porterville Enterprise*, Nov. 24: J. S. White informs us that a company located a claim on Deer creek and a shaft was sunk 100 feet in depth, drifts being run in several directions showing silver ore in abundance, assaying away into the thousands. The claim is owned by Mr. Morrison, John Roth and W. B. Wallace. A gentleman from Nevada, who has had large experience in silver mining, was there several days recently and pronounced it a valuable location. He went below with the intention of trying to get capitalists to take hold of it, and if he succeeds, hoisting works and a mill will be erected. Water and wood are plentiful, and a good wagon-road leads direct to the mine, and it is but a few miles from the railroad.

NEVADA.

Washoe District.

CROWN POINT.—*Virginia Enterprise*, Dec. 1: Have stopped No. 2 west crosscut on the 700 level to allow the water to drain from the face, and have started a south drift in the quartz, which is out 26 feet. The face is in quartz yielding fair assays. Shipped during the week 171 tons of ore to the Mexican mill for reduction.

HALE & NORCROSS.—On the 500 level the west drift was advanced 35 feet, making its total length 640 feet. Have done some necessary repairs to the main shaft and in different parts of the mine, and have constructed a new waste chute from the 700 to the 400 level, which required almost all our men during the week. Have commenced to stope ore from the 500 level and during the week hoisted 160 tons of pay-ore from the 500 and 700 levels. On the 25th inst. shipped to the Mexican mill 97 tons of ore and to-day 142 tons, and will continue to ship regularly and keep the mill fully supplied.

ALTA.—Have stopped the mill for two weeks for the purpose of changing its present working form to amalgamation and concentration. It has been found that much of the ore will amalgamate. Two concentrators will be set to run from two batteries, and each concentrator will take the crushing of the battery in that way, and the pulp will flow from the tail of the concentrators to the tanks, and will be put through the pans in the regular way. It is expected to get a very high percentage of the ore in this way, probably as high as 96 per cent.

GOULD & CURRY.—450 level—West crosscut started 60 feet from the top of the upraise from 500 level, has been extended 24 feet; total length, 104 feet; formation quartz, giving low assays.

BEST & BELCHER.—300 level—In west crosscut No. 1, 120 feet from the main northwest drift incline winze, has been sunk 20 feet; total length, 39 feet;

passing through porphyry and ore, the latter of fair assay value. At a point 25 feet west of the incline winze, a north drift has been advanced 25 feet; formation porphyry, clay and quartz, showing some value.

SAVAGE.—Men are employed easing timbers on the different levels and in the main shaft. During the week 732 tons of rock were hoisted 437½ tons shipped to the Rock Point mill, and 497 tons crushed. Average battery assays of the same were \$19.87 per ton. Have bullion on hand of the assay value of \$901.75.

BELCHER.—The 200 level north drift was advanced 30 feet during the week, making its total length 192 feet. Have turned the joint Seg. Belcher 1100 drift to the southwest and advanced 30 feet, making the total distance from the station 50 feet. The face is in good working ground.

CONFIDENCE.—The raise from the 1200 level to connect with the 1100 is up 50 feet, having advanced 19 feet during the week. Have shipped during the week to the Brunswick mill for reduction 103 tons of ore; the average battery samples show a value of \$22.95 per ton.

ALPHEA.—The 500 level north lateral drift is north of the shaft 182 feet; the face is in clay and quartz. The south lateral drift on the same level is in south of the shaft 85 feet; the face is in quartz that assays from \$12 to \$20 per ton.

YELLOW JACKET.—Running prospective drifts throughout the mine. The men at work extracting gold ore were laid off on the 28th pending the result of the test run of ore just working.

IMPERIAL.—The repairs to the main north drift on the 1100 level are almost completed, and have commenced to clean out east crosscut No. 1 preparatory to run across the vein.

CHOLLAR.—The raise from the north drift on the 650 level continues in low-grade quartz. The west drifts on the 750 and 850 levels are still in clay and quartz.

KEYSTONE.—The 300 level drift is still in hard rock, but it is approaching the vein, judging from its character, and it is liable to strike it at any moment.

SEG. BELCHER.—Have turned the east drift from the 100 station to the southwest and advanced it 30 feet. The face is in good working ground.

ANDES.—Have repaired stations No. 1 and No. 3, and are now repairing station No. 2. Are doing the usual work on the 350 and 240 levels.

CHALLENGE.—Shipped from this mine during the week 305 tons of ore, the average battery samples of which show a value of \$22.95 per ton.

BULLION.—Will have hoisting works in good running order again by next Tuesday, when the mining work will be resumed.

SCORPION.—On the 300 level the west crosscut has been advanced 15 feet during the week; the total length is 300 feet.

JUSTICE.—Are still stopping milling ore from the southeast winze. The west drift is now out 162 feet.

BALTIMORE.—Continue to extract high-grade ore from the upraise above the 338 level.

POROSI.—The 650 level south drift is showing clay and porphyry.

Ely District.

SHUT DOWN.—White Pine News, Dec. 1: The Ely G. M. and M. Co. shut down both mine and mill this week, and it is not likely they will resume operations before spring. The last run at the mill was made under difficulties of insufficient water-power.

Eureka District.

THE DIAMOND.—Eureka Sentinel, Dec. 1: The event of the week in mining circles in Eureka was the conditional sale of the Diamond mine to Messrs. Richard McIntosh and Charles Read of Salt Lake, both practical mining and smelting men, for the sum of \$60,000. A contract was let for the running of the tunnel to D. H. Foley, one of the owners of the Diamond, at \$11 per lateral foot. It is to be 407 feet long and will enter the Diamond ledge about 80 feet below the present workings. The purchasers furnish cars, track, and a complete black-smithing outfit. They will also incur other expenses amounting in the aggregate to about \$10,000. The purchasers show their faith in the property by paying for the construction of the tunnel and other necessary work.

ORE SHIPMENTS.—Sentinel, Dec. 1: The following number of tons of ore were shipped from the mines of the district to the furnaces: Dunderberg mine, 145½ tons; Macon City, 7 tons; Jackson, 269 tons; Diamond, 20 tons; West End, 25½ tons; Climax, 13½ tons; Silver Lick, 7 tons; Whip-poor-will, 2½ tons; Eureka Tunnel, 39½ tons; Sterling, 1½ tons; Williamsburg, 1½ tons; Mineral Hill, 5 tons; White Pine, 10½ tons; Hoosac, 46 tons; Democrat, 2 tons; Ethel, 1½ tons; Reveille, 4½ tons; Belmont, 5½ tons; and Seventy-Six, 1 ton.

Morey District.

PAYING.—Belmont Courier, Dec. 1: Work in the Morey mines is pushed with energy, and the ore extracted is of a paying quality.

New Pass District.

NEW CRUSHER.—Silver State, Dec. 1: E. E. Stearitt arrived yesterday from New Pass, where he is engaged in mining. The New Pass Co., of which he is a member, has ten men at work. They have ore enough on the dump to run a ten-stamp mill a month and an unlimited quantity of it in sight. They are putting up a Huntington crusher of 12 tons a day capacity and expect to have it running in three weeks. The lead on which they are at work averages about three and one-half feet wide and carries gold-bearing quartz exclusively. The mine was worked to a considerable extent, but as nothing less than \$20 per ton in free gold would pay in those days, the mill was taken to White Pine 20 years ago. The company has a U. S. patent for the mine.

Oscola District.

BEING WORKED.—Cor. White Pine News, Dec. 1: Capt. D. B. Akey & Co. are attending to their properties in good shape, which consist of the Cumberland, Royal Fish, Osceola, Union Jack, Florida and others. Work is also being done on the Gold Hill group. These with other good mines will soon bring Osceola on top as a gold-producing district. It is here both in quantity and quality, with facilities that cannot be excelled by any mining district on the coast.

Spanish Belt District.

BARCELONA.—Belmont Courier, Dec. 1: Work

in the Barcelona mine at Spanish Belt is progressing satisfactorily, and the ore extracted from this mine is of an excellent grade. The Barcelona is one of the best mining properties in this State. The Monitor-Belmont mill has been repaired and is running again on ore from the Barcelona mine. Lessee J. E. Severance received a lot of quicksilver on Sunday, and he expects that the mill will turn out fine bullion in large quantities.

Tybo District.

GOOD ORE.—Belmont Courier, Dec. 1: The Dimick mine is still producing large quantities of good ore.

ARIZONA.

OUR BIG COPPER MINE.—Arizona Silver Belt, Nov. 27: Information from the Old Dominion Copper Co.'s works is of a most encouraging nature. The output of copper has been continuous, and the result of this year's operations cannot but prove highly satisfactory to the company. The bins at the smelter are full of coke and a considerable quantity is en route from Wilcox; also a large consignment due at the latter place, its arrival having been delayed by difficulty met with in securing cars for its transportation. At the mine the showing is exceptionally good. The sixth level has been rapidly opened from the new shaft, the main ore body is already exposed at two points 140 feet apart, and stoping is now well under way. Other portions of the mine, we are told, look exceedingly well.

LUCKY CUS.—The winze between the 300 and 400 levels continues to yield the usual amount of ore. Work on the 400 north drift is being pushed ahead as rapidly as possible, as its connection with the winze from the 300 will open up a fine lot of stoping ground. Nothing new at the Mamie. The usual number of men are at work on the 700 and 300 levels extracting ore of a good grade. At the Brother Jonathan the work is still confined between the surface and the 50-foot level with fair results. The Sulphurets look well and ships about the usual amount of good-grade ore. At the Herschel considerable work is being done, the result being a fine yield of high-grade ore. This has every prospect of becoming a big profitable mine. A great deal of assessment is now being done in this district and in several cases with promises of good ore bodies. It is expected that the long drawn out suit between the Head Center and Tranquility will be decided by the Supreme Court of California next February. This suit is for a distribution of stock, after which there appears to be a prospect for a resumption of operations on these properties, which owe belong to the Contention Co.

BRITISH COLUMBIA.

ORE IN CARS.—Donald Truth, Nov. 27: Today (Saturday) the British Columbia Smelting Co. at Field had two carloads of ore standing on the sidetrack, and 20 more on the dump. If snow does not interfere with the tramway, regular shipments can be made from this time on, and the newspapers of British Columbia can herald the fact that at least one quartz mine in the Province has been developed into an ore-shipping.

COLD WEATHER CAME TOO EARLY.—R. L. T. Galbraith reports that the Chinese companies on Wild Horse creek were unable to finish their cleanups on account of the cold weather; but what they did clean up gave very satisfactory returns. He also reports that placer mining in the district tributary to Fort Steele has, in late years, never looked more promising.

THE KOOTENAY PLACERS.—Donald Truth, Nov. 17: The Perry Creek G. M. Co. has its tunnel in 535 feet, it following pretty much the same course as the old tunnel, being above it and in 15 feet farther. The work is in the old river channel, and going through what has evidently been a canyon. So long as they are in this canyon, gold is not expected to be found in paying quantities, as the bedrock is so smooth that gold would not remain on it. The gravel taken out prospects from 10 to 15 cents to the pan; but the returns are small, for the reason that more boulders than dirt are taken out in driving the tunnel. From present indications the channel will soon take a turn; if so, the bedrock will form a natural rifle, and immensely rich ground is sure to be struck. Part of the force are at work building an office and a storeroom. Work will be prosecuted all winter.

THE OTHER CREEKS.—Mr. Leonard, a practical miner who has stuck to Weaver creek for years, is reported to have done well this season, making a cleanup of over \$5000 in coarse gold. He has two men at work and will increase the force next summer. Weaver creek is a short distance from Cranbrook. The mining engineer who has charge of the work on Findlay creek is absent in California. The outlook is reported as good, and several small cleanups have been made. A windmill is being built in Bull river from which great results are expected. The ground lately worked has not turned out well, and operations will be resumed on the same side of the stream that has heretofore given good returns. Moyea creek is reported as no good. The only man holding his ground is the well-known Pat Quirk. The Chinamen, even, had to get up and dust.

WILD HORSE CREEK.—The four Chinese companies on Wild Horse are cleaning up for the season. So far, one of the companies had deeded up one flume out of four, getting over \$1000. Mr. Griffith, the only white man operating on the creek, is hydraulicking, and has not cleaned up for three years. He will not make a cleanup this year. He thinks he has between \$15,000 and \$20,000 in his flumes, and has picked up several good nuggets this summer, one of them being worth \$50, one \$15 and one \$11.

COLORADO.

SILVERTON.—Miner, Nov. 27: Joe Long and Frank Jones have a contract on the Ajax, one of the properties lately purchased by Colonel Horatio Page for a Boston syndicate. Capt. Horatio Page is thinking seriously of putting a force on the Victoria this winter. There is plenty of ore in sight, and we hope to see the mine one of our steady producers. The No Name lode at Needleton situated opposite the water-tank has been relocated by E. S. Ferguson, who is now busy doing the assessment work. The property near the Sunnyside mentioned last week is named the Clipper. It is being worked

by an English Co., and is under the superintendence of Captain Steel. The ore is a heavy galena running about 60 per cent. Wm. Feigel has just completed the improvements to the Whale stamp-mill, owned by Smith & Downing. The mill has mineral enough on hand to keep it busy all winter. We understand that the Mattie, situated up Cement creek, and owned by the Malchus Bros. and others, is likely to change hands shortly. The money to buy it is now in the bank and the final papers will probably be signed in the course of a few days.

DAKOTA.

RETRIEVER.—Deadwood Pioneer, Nov. 27: The corporation owns a group of five quite well developed Bald Mountain claims. On each, good ore is considerable quantity has been disclosed by operations of past years. Samples and assays of the different ore bodies, and of the ore now on the dump, establish its average value as between \$30 and \$35 per ton. At present there are not less than 4000 tons of ore of this value on the dump. The number of tons has been more frequently estimated at 7000 than at 4000. The company owns \$5000 worth of reduction works stock, and recently let a contract for hauling 500 tons of ore from the mine to the works, to Ed Goulette of Central. Tide to the claims is good, and will be perfect within the next few days, as the company is about receiving United States patent for them.

JUNEAU.—George S. Hopkins has completed surveys of claims belonging to the Juneau Co., Bald Mountain. Specimens of ore from the property were exhibited yesterday, which it is stated will run \$30 to \$40 to the ton. Walter Wood, lessee of the Adelphi, was over at Galena Friday, and made satisfactory arrangements with Mr. Terhune to have the Adelphi ore treated at the Galena smelter. Mr. Wood informs us that he gets much better results than at Omaha or Kansas City, and of course regrets having not saved the ore for Galena.

SMELTER.—The Galena smelter is running very smoothly, and the results so far are satisfactory alike to miners and smelters. Now let the miners put forth an extra effort to keep a supply of ore on hand for a continuous run. It puts money in circulation, gives employment to a large number of miners and laborers, and is a good advertisement for the camp and country.

UTAH.

REVIEW.—Salt Lake Tribune, Nov. 30: The week has been a good one for the handling of the minerals. Ore has come in freely and the bullion product has been large. The most important event of the week has been the strike in the Bullion-Beck at Tintic. The receipts in this city for the week ending the 28th, inclusive, were to the value of \$237,480.35, of which \$155,277.20 was bullion and \$82,203.15 was ore. For the previous week the receipts were to the value of \$99,064.64, of which \$58,390.80 was bullion and \$40,673.84 was ore. The Ontario product for the week was from three lots of ore sold, \$36,493.85; bullion, 24,895.95 fine ounces; an approximate total of \$61,299.80. The Ontario has deeded Dividend No. 150, payable Nov. 30th, of 50c per share, amounting to \$75,000. This will be \$825,000 so far this year, and \$10,350,000 in dividends in all. The daily output for the week was 11,482.07 fine ounces of silver and 11,225-1000 fine ounces of gold. Nothing is heard locally of the Horn Silver. Fine bar receipts in this city for the week amounted in value to \$66,897.99; base bullion, \$36,066.70; copper matte, \$8890. The product of the Hanauer smelter for the week was bullion of the value of \$25,350; of the Germania, \$18,669.51.

IDAHO.

SEAFAM DISTRICT.—Ketchum Keystone, Nov. 27: George B. Baldwin arrived in town last Thursday from Seafam district, via Custer. Mr. Baldwin is one of the discoverers and pioneers of the above-named district. He is interested in several valuable locations, from some of which he and his partners have been making shipments of ore for the last two or three years. The principal mines owned by him and his company are the White Goat, Birdie R. and Summit. Several tons of ore were shipped to Ketchum during the season from the White Goat mine, which yielded 269 ounces in silver and 24 per cent lead. Mr. Baldwin speaks very highly of the future of Seafam district and surrounding country.

ELK CREEK.—Wardner News, Nov. 27: Nothing but good reports are heard from Elk creek. In the main shaft of the Nellie lode a solid body of fine ore, three feet wide, was struck a few days ago at a depth of 200 feet, while other developments of equal importance are continually made in the various workings. A cleanup was had on the 15th instant, amounting to over \$8000.

DEADWOOD GULCH.—Recent developments in the Apex mine confirm the statements so often made regarding this property that it is destined to prove a valuable mine. The main shaft is down 250 feet, and a drift has been run on the ledge 135 feet showing ore all the way. In this working, at a distance of 100 feet, a large body of ore was recently encountered which increases in quantity and quality as work is now progressing.

HUNTER GULCH.—The building of the Hunter concentrator at the mouth of Hunter gulch is progressing rapidly. A number of skilled mechanics are engaged in its construction, and when finished it will be one of the finest mills on the South Fork. A greater portion of the machinery is now being shipped to Mullan.

MONTANA.

MONTANA COAL.—Helena Independent, Nov. 27: President Hill of the Manitoba says: A large force of men is now employed in these mines night and day, which are being systematically opened and developed. In a short time the output will be 2000 or 1200 tons daily, and this will be regular. The shipment of coal from the mines will be in excess of that amount should there be a demand for it. This coal is of an excellent quality. On this point I speak advisedly. We had the coal veins and their quality examined by Prof. Newbury of the New York School of Mines. The gentleman is an expert, and he pronounced the coal the best he had seen in the

Rocky mountains. The Montana Central engines are using it in preference to any other kind of coal, and the Manitoba Company will use it as far east as Red river. There is another 18-foot vein at Belknap, on the Gros Ventres reservation, but it is not as good as the Sand Conlee product. Following the opening of the mines will be the building of an extensive coking plant, the coking qualities of the coal being unsurpassed. As to the supply, it is practically inexhaustible. The veins are from 40 to 50 miles in width. What Montana needs and must have is cheap fuel.

TWIN MOUNTAIN DISTRICT.—Cor. Anaconda Review, Nov. 24: Many of your readers are interested in the new Carbonate Camp in Twin Mountain district, and I will send you a few pointers from this district. Some two years ago Lee Mantle and Chas. S. Warren grubstaked George Bow, and after looking around awhile he found rich carbonates and made a location between the head of American gulch and Gilsey creek, both tributaries of the Big Hole river. The same prospect was relocated some time in May, 1888, by Thomas Newcomb and J. R. Toole, and on June 13th a party named Edwards, who had many years before found rich float in that vicinity, with Joe Fletcher, discovered a rich carbonate vein, about a mile from French and German trail, and on the summit of main range one mile from Newcomb's location. Mr. Fish, on the L. P. Morton lode, has four feet of good ore. Mr. Fitts of the Grasshopper claim has a very fine vein of lead carbonates. The ore runs from 20 to 500 ounces silver and from 20 to 70 per cent lead. John Dunn, Strong & Co. have good carbonate in their New Orleans claim. Morgan Evans and L. Miller have a good prospect in the Gwinn Fraction lode. Manager Newcomb is working a force of men on the Richmond with very flattering results. McIntyre, McDonald & Co. are opening two very fine claims south of the American Gulch Mining Co.'s property. Walter Beaux, on the Borno, has a claim which will doubtless come up to any in the district. Catlin, Casey and Gregson, on the Old Fish lode, are down about 20 feet with their shaft which gives them good ore. MacCallum, Newcomb and others are working on the Montana, which has a very fine body of ore, assaying about 70 ounces silver. They shipped 20 tons the latter part of August, which brought the camp into note and prospectors flocked to the district. The formation is lime, and it is on the same belt with the Nellie Vipond and Trapper mines, and bids fair to be a great mining camp. Edwards, Fletcher & Co. on the Carbonate & Swan have what is conceded to be a good showing. They are working six men and taking out 80-ounce ore. Dr. Beals is working four men on the tunnel of his gold mine at the head of German gulch. He has had numerous assays which give \$112 in gold. There are many other promising claims in this district, among which we mention the claims of Perry Beals, McDonalds and others which are located about four miles from these others just mentioned, which show that the camp is of considerable extent. The route to this camp is by way of German gulch to Beals, distant from Anaconda about 18 miles, thence by trail on snowshoes 3 miles to Carbonate Camp. As the weather is too inclement to prospect at this season of the year, the miners in the camp, who now number 20, will have considerable ore on the dump when spring comes. What this district needs most is small reduction works, which we are informed will be built early in the spring.

NEW MEXICO.

MOGOLLONS.—Southwest Sentinel, Nov. 27: A sample of ore received in this city from the Mogollons gave on assay a yield of five ounces in gold and 80 ounces of silver per ton. The owner, Mr. Coffee, has a veritable bonanza in sight. A bar of bullion from Capt. Cooney, weighing 25 pounds, was received this week. It represents a run of 6 days with 5 stamps, and fully one-third of its weight is gold. The Sentinel has reliable information that it is now but a mere question of time until the Peacock mill will start up, arrangements having been perfected with that end in view. The storm of Saturday and Sunday will be productive of great good, and will furnish an abundance of water for mining, milling, grazing and domestic purposes.

PIÑOS ALTOS.—The mining outlook for the winter is favorable to all those who are directly interested. Many of the prospects, by spring, if the present rate of development continues, may, with reason, be classified among the producing mines of the county. The Maggie E. mine, on the southwest slope of Atlantic mountain, is rapidly coming to the front as one of the most promising gold prospects in the Territory. Messrs. Ashton, Bagsby & Co., the proprietors, made a lucky investment in the purchase of this property. The developments consist of a main shaft 40 feet in depth, showing a vein of fine milling ore, from 3 to 10 inches in width. A little south of the center of the claim a shallow pit on the vein has exposed a crevice of pay ore worth from \$100 to \$200 per ton. The St. Louis, in the immediate vicinity, the property of Frank Bell, Esq., is being worked under a lease. The vein is large and well defined, and on development is destined to become a very prominent mine in point of production and value of the ores extracted. The Carlisle Mining Co.'s mines produced in the seven months ending July 31st last, \$299,700, of which \$166,000 was gold and \$33,700 silver. This company has paid over \$300,000 in dividends to date. The principal office of the company is London, England, where most of the stock is owned.

OREGON.

THE SUMMIT MINE.—Bedrock Democrat, Nov. 27: The Democrat was favored with a call yesterday from J. P. McCord, one of Baker county's hardy miners and owner of the Summit mine, situated on Chicken creek, about five miles from Weatherby on the O. R. & N. Mr. McCord favored us with a brief account of his operations, which shows that portion of Baker county to be quite rich in mineral wealth. The Summit is of recent discovery, and since its location and up to a short time since Mr. McCord has been busy developing the property and also putting up an arastra to be run by water-power. The arastra was completed a few weeks ago and a run of 1½ tons of ore through it gave a yield of 33 ounces of gold, or \$533. Mr. McCord has a team engaged hauling ore from the mine to the arastra.

MECHANICAL PROGRESS.

Utilizing Petrified Wood.

In our last issue we gave a theory of the origin of the petrified forest of Arizona, as suggested by a popular scientific writer. Following we give from the same source some account of what is being done to turn this vast deposit to useful account:

Agate cutting has been carried on as an industry for over 300 years in the Oberstein district in Germany. But little attention has been paid heretofore to the cutting of large masses, because few agates are found over a foot in diameter, and the handling is not such as to offer much inducement.

Although the amount of silicified wood at this locality (Arizona) is so large—some estimates running as high as a million tons—the material suitable for purposes of decorative art is comparatively small in quantity.

The Drake Company, originally organized to work the quartzite of Sioux Falls, Dakota, have recently experimented with the methods of preparing the agatized wood for market. This silicified wood is brought in tree sections by the carload to the works at Sioux Falls. These sections run from six inches to five feet in diameter, generally with the bark perfectly preserved, and weighing from 50 to 2500 pounds each. The faces of these are irregular, and require to be worn down to a smooth surface. To accomplish this they are set in circular form in what is known as the "Drake Bed," being ten feet in diameter, composed of various-sized sections of the material, set by the use of the spirit level in order to secure an even face. They are then cemented together with calceine, or, if the pieces are small, with hydraulic cement. Then to two arms of a powerful vertical shaft are attached large slabs of Sioux Falls quartzite, in hardness but slightly removed from the wood itself.

These large, flat stones, which extend the full length of the arms, are revolved about the bed, fed by a stream of water and crushed quartzite reduced to the size of a pea. The silicified wood, being harder than the quartzite, soon wears groove in these large stones, and they are frequently reversed and sometimes discarded for fresh ones. For about 40 hours this initial stage of the work proceeds. The feeding of the crushed quartzite calls for fire, despite a copious flow of water upon the bed.

After about 40 hours of such work, the quartzite stones are substituted for large sections of the silicified trees, which have been previously worn upon the bed, and these are revolved for a week, and sometimes two weeks, fed with sand or quartzite until, by abrasion rather than cutting, a face is disclosed on the bed, which, for the first time, indicates the true coloring and quality of the material.

From these beds, each of which requires about 30-horse power when doing their best work, the material is taken up and re-bedded upon a car 30 feet long and 8 feet wide. In proportion to the exactness of face of the different pieces is the success of the undertaking. The car moves by cog, and at the same time males and female concentric rings, the outer of which is six feet in diameter, revolving at 40 revolutions, and here is continued the quartzite sand feed, in order to wear down any inequality of reetting upon the car.

This usually requires two days, and then the bed is cleaned, and diminutive globules, made of chilled iron, are rolled under the rings. These are followed by No. 36 emery. The emery rapidly wears to slush, and this feed is graduated down to No. 70 in fineness.

After a week of work the bed is then washed thoroughly, the rings removed, and large wheels substituted for the rings, which are made from blocks of hardwood, clamped together, presenting a rough surface by being set across the grain of the wood. The speed, both in the movement of the car and of the wheel, is now increased, and oxide of tin begins the burnishing, which is finally brought to a mirror finish by tripoli, fed to felt-covered wheels, which are revolved at 300 per minute. This process is a tedious one. A smaller car is sometimes employed. The sawing is done by a process which the company has not yet given to the public. In working up the material much is necessarily wasted.

Some idea of the hardness of this material may be formed when it is stated that 200 pieces of marble can be sawed up while one piece of agatized wood is being cut.

This petrified wood can be applied to all the purposes for which marble is used, over which it is much superior in both beauty and durability. This material is found in large quantities in Lake county and other localities in this State, but perhaps nowhere in such large masses and in such abundance as in Arizona.

The polished surface shows a beautiful blending of yellow and black, and in some respects resembles the redwood of the big Californian trees.

PRIMITIVE MANGANESE STEEL MANUFACTURE IN INDIA.—Part 3 of Vol. XXI of the Geological Survey Records of India contains an exhaustive and interesting paper by Bahoo Pramatha on the manganese iron and manganese ore of Jabalpur, in which we are reminded that the pyrolusite of Gossapur was first brought to the notice of Government by Mr. W. G. Olpherts in 1875. It has since been desultorily examined and experimented on by Mr. Medlicott and Mr. Mallett, but seems only now be-

ginning to be appreciated at its true worth; now when the uses of manganese as an alloy with iron in the manufacture of steel have been scientifically developed. In India it is employed in the manufacture of what Bahoo Pramatha calls "a kind of steel iron, known as kher"—an industry affected by nearly every village of the Lora Hill Ranges. The furnace in vogue is of a most primitive type, 4 feet 6 inches in height, a foot and a half in breadth, built of mud mixed with straw. The bellows for it are about a foot and a half high when stretched. They are made of goatskins. The making up costs a rupee. A pair will last one full season (November to May). The entire cost of furnace, bellows and all is but a trifle.

Soldering Cast Iron.

A correspondent of the *American Machinist* writes to that journal on the above subject as follows: In a foundry doing agricultural work there are a great many changes to be made to patterns, and often it is desirable to solder brass to cast iron where drilling and riveting to the pattern would make anything but a neat job. By a great many men who work on iron patterns it is considered quite a secret to solder on cast iron, but it is not so. This process is very much the same as soldering on a tinned surface. If the part of iron to be soldered is cast iron that is hard or thin, it should be polished on an emery wheel and made clean and bright. Then dip it in potash water, after which dip it for an instant in clear water and wash it quickly with undiluted muriatic acid of the ordinary strength; go over it with powdered rosin and solder made from half tin and half lead. This must be done quickly, before the surface has time to dry.

Another plan is this: File the surface clean and wash as before; wipe it over with a flux made of sheet zinc dissolved in muriatic acid until it is saturated or is a saturated solution, and has been diluted with its own quantity of water; then sprinkle powdered sal-ammoniac on it, and heat it on a charcoal fire until the sal-ammoniac smokes. Dip it in melted tin and then remove and rap off the surplus tin.

Patterns that are to be canceled are better made from a cheap brass, which can be made of 12 pounds of copper and 8 pounds of zinc. This will make a good yellow brass that will file easy and finish smooth. There are few men that fully understand carding patterns; patterns can be carded by drilling small holes in the side of the pattern and putting small wires from one to the other, and filling in between with melted lead and then putting a strip of brass the entire length of the patterns for flowing the metal; all small work should be carded, as this is a cheap way of molding small work.

Where a few small patterns are wanted, and wanted quickly, they can be made from one pound of zinc and one of tin; this is a good metal to finish.

PISTON-ROD FRICTION.—In a paper on "The Distribution of Internal Friction of Engines," read a few weeks ago before the American Society of Mechanical Engineers, Prof. Thurston, among other sources of loss of power from friction, referred naturally to the friction of the piston and its rod. He characterized it as a decidedly variable fraction, varying not only with the class of engine, but also in the same engine when differently handled. It is not surprising that this should be so, especially when we consider the large variety of packings and packing rings with which the market is supplied, and the uncertain measure of tightness and protection against leakage afforded in the person of the average attendant. It has been remarked, facetiously, perhaps, but not wholly without foundation, that the first thing which a new engineer will do with an engine is to set out the packing rings, and that similarly this one unfailing remedy for any slight trouble with an engine is the same setting out of these rings. That the friction of a piston should be enormously increased by such tinkering with an engine is but natural, and instances are not unknown where machinery had become almost inoperative from this cause, the friction from unduly creased-down stuffing-boxes, moreover, adding to the difficulty. Under the circumstances, the unpacked pistons and rods, which are now gradually coming into use, are to be welcomed as important advances in engine construction.

THE RAPIDLY INCREASING USE OF IRON is alluded to by the Boston *Journal of Commerce* as follows, under the head of "An Unsolved Mystery": Iron, of all others, is the metal in most general use, and, unlike wood and other materials which "perish in the using," iron, when it has served its purpose in one position, goes to the foundry or forge as scrap iron and returns for some other use, as good as new, with very little loss. Old castings are recast in some new form, and are no way inferior to castings made of new pig iron. Old rails are re-rolled and come out new. It is only in the form of nails and some other small matters that iron is lost. Now when we observe the millions of tons of pig iron, fresh from the ore, that is added to the stock on hand every year, the mystery is that the demand still remains unsupplied. The constantly increasing use of iron in all its forms would account for the increased output from the furnace every year, if, like other materials, it perished with the first use; but as it returns to the common stock as new material, why is the demand still maintained?

SCIENTIFIC PROGRESS.

Why Does Lime Make Water Boil?

A cotemporary answers the above question somewhat at length as follows: The inquiry relates to an interesting fact, which everybody knows, but the explanation of which is based in a measure upon theories. Scientific men theorized upon the question, What is heat? until the realm of theory was well-nigh exhausted before they settled upon one which seemed satisfactory. The accepted theory now is that heat is motion or vibration. It is known that it is a force. It is explained to be the molecules of one substance or body acting upon the molecules of another.

A piece of iron may be hammered into a red glow, but it is the evolution of its latent heat, and the iron is made more solid by the hammering. Any substance, whether gaseous (exceptible of being solidified), liquid or other forms of matter, in the process of solidification throws off heat. Carbonic acid gas may, by tremendous pressure, have the heat squeezed out of it until it becomes a solid lump of ice, of such a low temperature that it will act on the hand that takes it up like a piece of hot iron. In proportion as the process of solidification is rapid, is the rapidity with which the heat is thrown off and its presence made apparent.

Every substance contains a greater or less amount of calorific or the principle of heat. Rapid chemical changes, produced by a strong affinity of two substances, evolve heat, but why, no one can explain, unless by the energetic action of the molecules of one upon those of the other, and this brings us to the subject of the query.

When lime is subjected to a calcining heat the carbonic acid it contained is driven off, and there is left what is called oxide of calcium, or caustic lime—called in common parlance "quicklime." This quicklime has a very great affinity for water, and if exposed to the air will gradually absorb the moisture from the atmosphere. The water combines chemically with the quicklime and becomes a solid. This mass dissolves slowly. The process in this case is so slow that the evolution of heat is not noticeable. The combination forms hydrate of lime, its constituents being calcium, oxygen and water. If the lump of quicklime is suddenly immersed in water, the former acts with great energy upon the fluid, absorbing a vast quantity, which immediately undergoes a chemical transformation and becomes solid. The theory is that the energy of this chemical action upon the water produces the heat which causes water to boil.

The Barometer and Colliery Explosions.

The record of a highly interesting series of experiments on the relations between barometric fluctuations and the appearance of fire-damp in collieries has been given by the Austrian engineer, Quaglio. A number of serious accidents had taken place at the Ostran and Karwin mines belonging to Archduke Albrecht of Austria. This caused him to give orders to his officers to conduct any experiments which might lead to methods enabling colliery managers to anticipate the dangers of such disasters. In June, 1885, a series of experiments was begun, which are being still continued, consisting of keeping an accurate record of the fluctuations shown by the barometer and daily analyses of the air in the mine of the Gabriela colliery at Karwin. The result of the comparison of these data was that the quantity of fire-damp increases, generally speaking, as the barometer falls, but that its development is not dependent upon a very low barometer.

Not content with this information, a novel experiment was tried. On the 20th of June work at the mine was stopped and the inlet shaft sealed, while the suction fan continued to work, this being kept up for 27 hours. The barometer in the mine sank $2\frac{1}{2}$ mm. Inside of five minutes, and the gas contents at the fan rose 83 per cent, and in the vicinity of the Carl seam, 40 per cent. During later experiments the barometer fell four mm., the fan ceased to work, and in one case the percentage of gas in the vicinity of the Carl seam rose 135 per cent.

So well convinced are mine-owners in that vicinity that explosions are more likely to occur during an unusual fall of the barometer than at other times, that orders have been given to a number of superintendents to suspend work and order every one out of the mine during any very unusual fall of the barometer. Experiments still in progress show that the quantity and intensity of explosive gases greatly increase as the degree of atmospheric pressure diminishes.

DANGERS IN GUN DISCHARGES.—There are two distinct periods in the discharge of a great gun during which damage may result to surrounding objects. When the projectile leaves the gun, it is followed by a volume of gas at a high tension and moving like the shot at a great velocity. This gas, expanding enormously, and moving at a high velocity at the same time, causes a violent blast, driving the air before it, and thus producing in its rear a partial vacuum. This blast, therefore, is the first element of destruction, and carries away everything movable in its path. The air rushing in from all sides to fill this vacuum produced by the blast causes a reaction—an object moved in one direction by

the blast would be moved in the opposite direction by the rush of air. This movement of air to restore equilibrium is very violent, and doors are hurst open from the inside, owing to the excess of pressure on that side. For this reason it is well, when possible, to leave all superstructure doors open, that there may be a free circulation of air, otherwise locks and hinges will be torn off and doors will open themselves.—*Engineer*, N. Y.

A PHYSICAL IMPOSSIBILITY.—Prof. Le Conte, in *Popular Science Monthly*, gives his views on the flying-machine question as follows: We must admit that a bird is an incomparable model of a flying machine. No machine that we may hope to devise, for the same weight of machine, fuel and directing brain, is half so effective. And yet, this machine, thus perfected through infinite ages by a ruthless process of natural selection, reaches its limit of weight at about 50 pounds! I said, "weight of machine, fuel and directing brain." Here is another prodigious advantage of the natural over the artificial machine. The flying animal is its own engineer; the flying machine must carry its engineer. The directing engineer in the former, the brain, is perhaps an ounce, and in the latter it is 150 pounds. The limit of the flying animal is 50 pounds. The smallest possible weight of a flying machine, with its necessary fuel and engineer, even without freight or passengers, could not be less than 300 or 400 pounds. Now, to complete the argument, put these three indisputable facts together: 1. There is no low limit of weight, certainly not much beyond 50 pounds, beyond which it is impossible for an animal to fly. Nature has reached this limit, and with her utmost effort has failed to pass it. 2. The animal machine is far more effective than any we may hope to make; therefore, the limit of the weight of a successful flying machine cannot be more than 50 pounds. 3. The weight of any machine constructed for flying, including fuel and engineer, cannot be less than 300 or 400 pounds. Is it not demonstrated that a true flying machine, self-raising, self-sustaining, self-propelling, is physically impossible?

PHILOSOPHY OF "THE LURCH BACKWARD."

The question has often been asked why passengers on cars "lurch backward" at the sudden stopping of a train, instead of forward as they always do on a steamboat which stops suddenly, as when a ferry steamer comes into its dock and strikes the pile with considerable force. The *Manufacturers' Gazetteer* explains the conundrum as follows: Passenger-car brakes are attached to the truck-frames, and the frames to wheels, axles and cars, through the medium of stiff springs. An application of the brakes tends to raise the rear end of a truck and depress the forward end. At the moment of actual stop the springs relieve themselves of the pressure put upon them, the truck regains its level position, and the car-wheel is revolved from one to six inches backward in a very short space of time. The backward movement of the wheel carries the car with it a corresponding distance, and the passengers, braced in a forward direction to resist the stopping action of the brakes, are "set back" by the "recoil," if it may be called by that name.

PHOTOGRAPHING THE EARTH'S SURFACE.

A wonderful device has just been invented by a Mr. Steffens, a Chicago photographer. Steffens' patent is for a device for sending a camera up above the earth about 2000 feet by means of little balloons, then steadying and focusing them, and making an exposure of a large section of the earth's surface by means of an electric wire. According to the plans, 48 exposures can be made at each ascension, the sensitized paper revolving upon a cylinder. It is estimated that at an elevation of 2000 feet, a region of 75 miles in diameter could be photographed with very satisfactory clearness.

THE EEL is a very singular fish, and one that has hitherto eluded the most thorough efforts of scientists to discover its spawning places. Fred Mather, the well-known fish culturist, has been making some very interesting experiments with the microscope which prove that there are 9,000,000 eggs in an eel. How and when these eggs are hatched has always been, and still is, a mystery. All that is known definitely is that the old eel runs down to salt water in October, and that in the spring swarms of young ones, the size of a darning-needle and about two inches long, ascend the rivers.

PROF. HUGHES has shown that a stranded iron wire cable has less self-induction than one of the same mass of metal formed into a solid wire. The explanation of this is that the circular field of magnetic force around the axis, which exists inside the wire as well as outside, is not as strong in the interior of the stranded iron cable as it is in the interior of the solid iron rod. The stranding reduces the magnetic permeability along lines which are circled and derolled around the axis, and hence reduces the self-induction.

A SCIENTIFIC SCHOOL was established at Timmen, Siberia, many years ago. It occupies the largest and finest building in the town. It has a mechanical department, thoroughly equipped with a steam engine, lathe and a great variety of machine and hand tools. When one remembers that Timmen is 1700 miles east of St. Petersburg, in the midst of a country in which according to popular belief little else is to be found besides snow, ice and exiles, the above statement is somewhat remarkable.

GOOD HEALTH.

Night-Air Superstition.

All our life, since we arrived at a fighting age, have we fought, in our home, in our office, everywhere, for fresh air and thorough ventilation throughout the whole 24 hours; and especially have we contended for plenty of fresh air during our hours of sleep. We have been met with all sorts of arguments against our views, but as they came, nearly always, from asthmatic or consumptive sources, we simply inhaled our lungs with more good sparkling ozone and smiled as we passed on. At about the half-century mark we are not, and never have been, afflicted with the slightest lung or vital trouble, and one or more windows are open in our sleeping rooms the whole of the year around.

One thought has been set at work in this direction by finding in one of our exchanges some remarks upon night-air superstition, which we propose to quote, in the hope that they may be of benefit to some one of the altogether too many who seem to fear the fresh air of heaven:

"A sensible doctor, who despises drug-cataloging, and realizes that health is only possible by conformity to Nature's simple but exacting laws, is quoted in an English paper as maintaining that the superstition that open night air is to be avoided has destroyed more victims than war and pestilence. This widely prevalent prejudice is worse than ignorance, just as poison is more fatal than hunger:

"That pulmonary consumption is not caused by cold outdoor air, but by foul indoor air, is a truth established by incontestable proofs. Statistics prove that north and south, east and west, in uplands and lowlands, the prevalence of respiratory disorders bear an exact proportion to the prevalence of indoor occupations. Experience, moreover, has demonstrated that for the radical cure of lung diseases, outdoor life in cold climate is more favorable than any mode of life in tropical climate. Horses and cows confined in stuffy stables are as liable to deadly pulmonary affections as their owners, while exposure to intense winter cold affects the respiratory apparatus less than any other part of the organism."

"By way of illustration, reference is made to the mane-baboon, which endures the night frosts of the Abyssinian highlands, at the elevation of 8000 feet above the coast plains of the Indian ocean, yet succumbs promptly to the influences of the foul though much warmer air of an ill-ventilated menagerie; and the following is added from an experience which has been repeatedly verified in cases personally known to us:

"I prefer the night-air cure. We cannot work under a load of furs. We cannot write with frost numbed hands. But with an adequate number of blankets, a bed exposed to the fresh air can be made perfectly comfortable. Use a nightcap or a shawl till habit has taught a way of keeping the blankets tucked up to the ears, leaving only the face uncovered—the plan of keeping the head cool and the feet warm being, by the way, the most effective specific for chronic insomnia. To the lungs pure, cold air is more grateful than impure, warm air. By the simple plan of opening a bedroom window, catarrh can be nipped in the bud by a removal of the cause—that is, by a direct elimination of the contagious germs."

There would be vastly fewer puny, pale, and gasping beings loitering around in this world, and there would be a great many less deaths from pulmonary causes, if humanity would conquer its too wide-spread aversion to fresh air.—*Our Society Journal.*

Vital Grit.

I have seen grit save many a life. I have had a patient who coolly said to me, "I will not die." I was compelled to assure her that she would. There was no hope for her. "Doctor," she answered, "you are a fool. I shall not die." Grit it was that carried her through.

A few years later she was sick again, and, as I thought, unto death, but there came the same all-conquering reply, "You are talking nonsense; I shall get well." And she did. This was repeated a third time, till I actually began to believe she would get well anyway at all times. It never occurred to me to think of her as liable to die.

Finally her mortal sickness came, and I expected to help her up as usual. But now she replied, "Doctor, you can come or go as you please; I am going to die; this is my last illness."

"Oh, no," I said, "we will have you out in a few days."

"Nonsense," she answered; "you are talking of what you know nothing about. I shall never be well again."

In two days she was dead. Her grit gave out; her pluck was good to the last. She had pluck enough to face death; she had no longer grit to endure disease.

There is no question that moral and mental grit go with physical to sustain vitality. A stout will wards off the blows of disease. In this case the patient went straight ahead to die without a flinch or whine. She had a vast faith in the "All Right," and allowed no one to dabble in theology at her bedside. She marched into the next life as she often had into the next year, and she had not a tremor. She

took her pluck with her. She treated a neighbor's prayers as she treated any medicine. "You can come if you like," she said, "or you can go. Your prayers can't stop me, and they can't change me—no more than the doctor's powders." She was a woman of extraordinary intelligence and determination.—*Dr. Maurice in St. Louis Republic.*

QUALITIES OF ALUM.—Alum is said to have power to purify water, and even to expel the bacteria it sometimes contains. That muddy water can be so cleared has long been known; but it is a comparatively recent discovery that a very small quantity of alum, so small that it is not injurious to drink the water that contains it, will rid the water of nearly all its bacteria. A Pennsylvania physician found that the water that was drawn by the people of a village where typhoid fever was epidemic was swarming with bacteria. Fifteen drops of it, when spread upon a suitable surface, were capable of forming 8100 colonies of these microscopic vegetable germs. He added alum, in the proportion of half a grain to a gallon, and found that not only were the earthy and vegetable matter precipitated, but that the colonies of bacteria were reduced from 8100 to 80, and these were of large size.

A NEW AND NOVEL REMEDY FOR POISONING. A curious and novel method of saving life in certain cases of poisoning has been originated by Dr. Carlo Sanquirico of Sionna. By largely increasing the volume of the blood, which can be done by injecting into the arteries saline solutions to the amount of about eight per cent of the weight of the animal, the poisons are actually rinsed out and eliminated from the system. In this way the lives of dogs and guinea-pigs were saved after being dosed with deadly amounts of strychnine, chloral, alcohol, aconitine, paraldehyde, caffeine and urethane. With certain other poisons, as morphine, curarine and nicotine, the method failed. It is not at all impossible that this discovery may introduce an improved treatment, not only for cases of poisoning, but for certain diseases.

REMEDY FOR BILIOUSNESS.—One of the best and simplest remedies for torpid liver or biliousness is a glass of hot water with the juice of half a lemon squeezed in it, but no sugar, night and morning. A person to whom this was recommended tried it, and found himself better almost immediately. His daily headaches, which medicine had failed to cure, left him; his appetite improved, and he gained several pounds within a few weeks. This is so simple a remedy that any person thus afflicted will do well to give it a trial, as it cannot possibly do any harm.

USEFUL INFORMATION.

Elastic Traces.

Foreign papers have recently directed attention to experiments which have been made in lightening the work of animals in drawing heavy loads by the use of elastic traces. It appears that some time ago M. Celler, Chief Engineer of Roads and Bridges in France, expressed a doubt whether the traces of leather or rope, or the iron chains, by which horses pull their load, could not advantageously be replaced by more elastic appliances, which would diminish the effort needed at starting to overcome the inertia of a heavy cart or omnibus.

Every one has noticed that a dray-horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on M. Celler's suggestion, the directors of the Eastern railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with traces made of chains having a strong spiral spring inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory.

A considerable gain has been made in the durability of the harness and the regularity of the work, through the diminution of the number of chains broken in the service, while the horses have done their work better and with less fatigue. The blow of the collar on the shoulders at starting is far less violent, and less injurious to the animal, than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was formerly necessary, seem to gain courage, and pull steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial the directors of the company have become so convinced of the superiority of the new mode of harnessing that it has been adopted in all portions of the vast network of lines under their control.

AN ANCIENT MATCHLOCK.—A curious Tibetan musket or matchlock has found its way from Sikim, where it was picked up after a battle, to Calcutta. It is described in the Indian papers as of primitive design, although comparatively new. It is a smooth-bore muzzle-loader, mounted on a long narrow stock. The barrel is fitted with a double prolonged rest, the points of which are sharply shod so

that the rest itself may either be placed firmly in the ground or need, if necessary, as a hayonet. The contrivance is ingenious and the weapon is not altogether to be despised. Attached to it is a belt, on which are strung six hollow wooden plugs for powder charges and a small horn for priming powder. The workmanship of the whole is very rough, and there is scarcely any attempt at ornamentation.

FLOUR FROM CORNSTALKS.—Cornstalks are the most recent vegetable production from which flour is derived. The other day, heechwood was credited with a similar yield. The inventor, whose name is given as "Dennis," and who is an acquaintance of the editor of the Indianapolis *Millstone*, claims that "there is a hulk equal to one fourth that of the stock (stalk) stripped of its fodder, which is equal in quality to the best winter-wheat clear flour." The process of eliminating the new product requires the cutting off of about ten inches of the lower end of the stalk, which is hither. The leaves are stripped off next, and the stalk cut into pieces half an inch long. These are thrown into machines which beat them to a pulp, and this is subjected to the ordinary methods of separation. From the solid portions which remain—the outer covering of the stalk and the hair-like fiber of the interior—the flour is evolved and subsequently separated by bolting. The inventor believes that he stands "in the position of one who will reduce the value of the wheat crop in this country fully one-half."

HOW TO MEASURE A MILE.—It is often convenient to know, approximately, the distance between localities not far apart. This can easily be done in the following manner: Wrap a stout string around the rim of a carriage or wagon wheel, drive slowly over the distance, and count the number of revolutions which the wheel makes. A mile is 63,330 inches. Now measure the circumference of your wheel, and by a little simple calculation you may learn the distance you have traveled. Again, we will suppose that a wheel is 160 inches in circumference, and in going to the postoffice it made 900 revolutions; now, 160 multiplied by 900 revolutions will show the distance to be 144,000 inches; divide this by 63,360 and the quotient (distance) will be 2 miles and 17,280 inches, and this divided by 12 inches in a foot will give 1440 feet, and this divided by 16½ feet in a rod will show 87 rods, or 7 morn than a quarter of a mile, or a total of 2¼ miles and 7 rods.

ARTIFICIAL CULTIVATION OF SPONGES.—An industry in artificial cultivation of sponges is in process of creation. M. Oscar Schmidt, professor at the University Gratz in Styria, has invented a method by which pieces of living sponges are broken off and planted in a favorable spot. From very small cuttings of this kind Prof. Schmidt has obtained large sponges in the course of three years at a very small expense. One of his experiments gave the result that the cultivation of 4000 sponges had not cost more than 225 francs, including the interest for three years on the capital expended. The Austro-Hungarian Government has been so much struck with the importance of these experiments that it has officially authorized the protection of this new industry on the coast of Dalmatia.

A NEW USE FOR SALMON REFUSE.—The refining of lubricating oils from salmon refuse, which was commenced months ago on a small island near the mouth of the river, has been attended with much success. According to the law, the canneries are prohibited from throwing away the salmon refuse as long as a refinery is in working order and can use the refuse. In this way the refiners have an opportunity of securing material at a very small cost, and the only real expense is in extracting and refining the oil. So far this season 2000 gallons have been refined, and 3000 gallons more will be made before the season closes. Had the salmon run been good this year, these figures would have been doubled or trebled. Two grades of oil are refined and both are admitted to be fine lubricators.—*Westminster, B. C., Columbian.*

VEGETABLE WOOL AND SILK.—The Buenos Ayres *Herald* claims to have examined the fiber made from the reeds and rushes of the lowlands of the Parana, and that the textiles manufactured therefrom are undistinguishable from those made from wool and silk. Blankets, heavy goods for men's wear, feltings and "black-silk" dress goods are all manufactured from this fiber, and are said to be unrivaled for texture, finish, color and durability. Paper pulp is also made from these reeds and rushes, the manner of utilizing them being the invention of Mr. Newman.

OIL SPOTS ON WALL PAPER caused by persons leaning their heads against walls may be removed by making a paste of fuller's earth and cold water and laying some gently on the surface to be cleaned, leaving it until dry, when it may be brushed off and the spot will have disappeared. It works best on plain paper, but it does not succeed so well on thoroughly colored.

BRAINS IN TANNING.—The Indians tan buffalo-skins with brains, and as an evidence that they use more brains in tanning than many of their white brethren they tan only when a "prophet" assures them that the business will be remunerative.

ENGINEERING NOTES.

The Canal of Joseph.

How many of the engineering works of the nineteenth century will there be in existence in the year 6000? Very few, we fear, and still fewer those that will continue in that far-off age to serve a useful purpose. Yet there is at least one great undertaking, conceived and executed by an engineer, which during the space of 4000 years has never ceased its office, and on which the life of a fertile province absolutely depends to-day. We refer to the Bahr Jousuf—the canal of Joseph—built, according to tradition, by the son of Jacob, and which constitutes not the least of the many blessings he conferred on Egypt during the years of his prosperous rule. This canal took its rise from the Nile at Asint, and ran nearly parallel with it for nearly 250 miles, creeping along under the western cliffs of the Nile valley with many a bend and winding, until at length it gained an eminence, as compared with the river-bed, which enabled it to turn westward through a narrow pass and enter a district which was otherwise shut off from the fertilizing floods on which all vegetation in Egypt depends.

The northern end stood 17 feet above low Nile, while at the southern end it was at an equal elevation with the river. Through this cut ran a perennial stream which watered a province named the Fayoum, endowing it with fertility and supporting a large population. In the time of the annual flood a great part of the canal was under water, and then the river's current would rush in a more direct course into the past, carrying with it the rich silt which takes the place of manure, and keep the soil in a state of constant productivity.

All this, with the exception of the tradition that Joseph built the canal, can be verified to-day, and is not mere supposition or rumor. Until eight years ago it was firmly believed that the design had always been limited to an irrigation scheme, larger no doubt than that now in operation, as shown by the traces of abandoned canals and by the slow aggregation of waste water which had accumulated in the Birket el Qaerun, but still essentially the same in character.

Many accounts have been written by Greek and Roman historians, such as Herodotus, Strabo, Mutianus and Pliny, and repeated in monkish legends or portrayed in the maps of the Middle Ages, which agreed with the folklore of the district. These tales explained that the canal dug by the ancient Israelite served to carry the surplus waters of the Nile into an extensive lake lying south of the Fayoum, and so large that it not only modified the climate, tempering the arid winds of the desert and converting them into balmy airs which nourished the vines and the olives into a fullness and a fragrance unknown in any part of the country, but also added to the good supply of the land such immense quantities of fish that the royal prerogative of the right of piscary at the great weir was valued at \$250,000 annually. This lake was said to be 450 miles round, and to be navigated by a fleet of vessels, while the whole circumference was the scene of industry and prosperity.—*Engineering.*

THE SIDEWHEEL FERRY-BOATS MUST GO.—Steamboat men say that the sidewheel ferry-boat will soon be a thing of the past, and boats with propellers at each end will supersede them. The new idea is indorsed by many shipbuilders, practical architects and marine engineers. The important advantage of the propeller is that it takes less room on the boat, gives greater speed on less consumption of fuel and can be easier handled, besides costing less. The shaft will run through the boat from end to end, with an average-sized propeller at bow and stern. The first boat of this pattern was designed by J. Shields Wilson and built at Newburgh, N. Y. It is 200 feet long, has triple-expansion engines with cylinders 18½, 27, and 42 inches in diameter, and improved steel boilers. The screw on the stern of the boat pushes the vessel ahead, while the one at the bow pulls. When a stop is required, the reversal of the propellers checks the boat very quickly. This boat is regarded with much interest by those interested in maritime affairs.

VON SCHMIDT'S DREDGERS IN BOSTON.—A company has been formed by New York and Boston capitalists for the purpose of dredging Charles river and reclaiming the adjacent Cambridge marshes. The dredgers to be used are those invented by Mr. Von Schmidt of this city. These machines take up the mud from the bed of the river and deposit the material on the shore by hydraulic pressure through iron pipes laid overland or across pontoons, and thus may be made to reclaim land a mile away.

HIGH RAILWAY SPEED.—The high railway speeds recently attained on several English roads show that where sufficient inducement offers, modern railway appliances are capable of approaching very closely to the apparent limit of one mile a minute.

A BUILDING in Chicago which weighs 20,000 tons and is 6 stories high is being lifted up 6 feet 5 inches. Several thousand screw jacks are used and it takes 300 men to work them. The average lift is 1 foot per day. The cost will be \$40,000.



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SAN FRANCISCO

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TABLE OF CONTENTS.

ILLUSTRATIONS.—The Jewell Water Purifier, 378. The Dauntless Diamond Drill; Ransome's Patent Apparatus for Concrete, 381.
EDITORIALS.—Jewell's Patent Water Purifiers, 378. Passing Events; Smuggling Lead Ores; New Mining Patents; Diamond-Pointed Rock Drills, 380. Labor Organizations; Coast Industrial Notes, 382.
CORRESPONDENCE.—The Mines of Plumas, Sierra and Nevada Counties; Bodie Tunnel, 374. The Lixivation of Silver Ores with Hyposulphite Solutions, 375.
MISCELLANEOUS.—The New Source for Chlorine Gas; Geology of Utah Coal-Fields, 375.
MECHANICAL PROGRESS.—Utilizing Petrified Wood; Primitive Manganese Steel Manufacture in India; Soldering Cast Iron; Piston-Rod Friction, 378.
SCIENTIFIC PROGRESS.—Why Does Lime Make Water Boil; The Barometer and Colliery Explosions; Dangers in Gun Discharges; A Physical Impossibility; Philosophy of "The Lurch Backward"; Photographing the Earth's Surface, 378.
GOOD HEALTH.—Night-Air Superstition; Vital Grit; Qualities of Alum; A New and Novel Remedy for Poisoning; Remedy for Biliousness, 379.
USEFUL INFORMATION.—Elastic Traces; An Ancient Matchlock; Flour from Cornstalks; How to Measure a Mile; A Fictional Cultivation of Sponges; A New Use for salmon Refuse; Vegetable Wool and Silk; Brains in Tanning, 379.
ENGINEERING NOTES.—The Canal of Joseph; The Sidewheel Ferry-Boats Must Go; Von Schmidt's Dredgers in Boston; High Railway Speed, 379.
COTTON AND WOOL.—Cotton Manufacturing at the South; The Increasing Demand for Cotton and Iron; Cotton-Mill in Japan, 383.
BOOTS AND SHOES.—Changes in Shoe Manufacture and Styles; Miscellaneous, 383.
THE WATCHMAKER.—American vs. Imported Clocks; Non-Magnetic Watches; Miscellaneous, 384.
SHOP NOTES.—Trained Mechanics; Finish What You Begin; Ingenious Way of Cooling a Journal; Waste of Lubricating Oil; Miscellaneous, 384.
MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 380-81.
MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 388.

Business Announcements.

[SEE THIS ISSUE.]

Electric Motors—Joseph L. Jayne.
Elevator Clutches—B. E. Heakken.
Books—H. C. Baird & Co., Philadelphia.
Assessment Notice—Gover Mining Co.
Dunker Portable House Co.—New York.
See Advertising Columns.

Passing Events.

The tests of the water-power and electrical plant to run the big mill up on the Comstock have been very satisfactory. There will be changes in some minor details probably, but the general plan is successful. We shall soon have a detailed description of this plant.

There is much complaint among lead miners relative to the smuggling of lead ores into this country from Mexico. It is probable that Congress will very shortly take active steps to prevent this going on any further. Still very powerful railroad and smelting influences would rather have things remain as they are. There is money in this smuggling for some people on both sides of the border.

Preparations are being actively made by several scientific parties to properly observe the coming eclipse of the sun. Most of the parties will observe in California, but some will go to Nevada, thinking they are more sure of clear weather at this season.

In a few weeks a report on the alien ownership of mines in the Territories will be made to Congress. The matter is now being investigated thoroughly.

Smuggling Lead Ores.

For some months the attention of the lead miners of the United States has been turned to the Mexican border, where lead ores are being brought into this country without paying any duty. The question is a very important one to Western mining and smelting men. The traffic is carried on under a ruling of the Secretary of the Treasury to the effect that the duty, if any, is paid on the predominating metal in the ore. The silver ore comes in free of duty; so as long as the ore contains more in value in silver than lead, then the lead in it pays no duty. In this way large quantities of lead ore are coming in free, to the detriment of American lead-producers.

We had a conversation this week with Mr. Ivan C. Michels, Statistician of the Committee on Mines and Mining, U. S. Senate, who is on this coast engaged in investigation concerning alien ownership of mines. He spoke of this subject of smuggling of lead ores, it being one to which he has given considerable attention.

He says the smuggled lead ores come in by way of Nogales, Arizona Territory, Laredo, Texas and Eagle Pass, Texas. The lead ore is conveyed by one car of silver ore, say as one to nine—nine cars of lead ore to one car of high silver ore, under the direction and instruction of the Secretary of the Treasury. All of the ore having its chief value in silver, comes in free, no matter how much lead, copper or any other metal it contains.

"The ores from Mexico very often contain from 40 to 60 per cent of lead ore, and from 8 to 15 per cent of silver ore, on which freight, as well as 10 per cent loss, are charged against the lead ores. In this way all charges are made against the lead ore, none against the silver, thus reducing the value of lead ore materially, and correspondingly increasing the value of silver ore. They have erected two smelting works at Laredo, Texas, and one at Nogales, and the ores containing higher grades of lead and silver are shipped to Kansas City, Denver and Omaha for smelting. As much as 4000 tons of lead have been brought over or smuggled in in one month. The Mexican Government is very much opposed to this kind of smuggling, preferring to have the ores smelted in Mexico, and are anxious to sell the lead. They are willing to aid the United States Government to suppress this traffic. The Utah, Montana and Idaho lead miners are those who are enfeebling the most."

We called Mr. Michels' attention to a statement made by the *Denver Weekly Republican*, that the ruling of the Treasury Department upon the admission of silver-bearing lead ores free of duty had been brought to the attention of the Judiciary Committee of the Senate, of which Senator Edmunds is chairman, and that this committee reported that the ruling is in accordance with the statutes. Mr. Michels says: "The *Denver Republican* is in error about it. Senator Stewart of Nevada some time ago introduced a resolution in the Senate, asking why lead ores bearing silver ore come free. This resolution was referred to the Judiciary Committee, of which Senator Edmunds did not give an opinion as chairman of that committee, but addressed a letter to the Secretary of the Treasury asking his opinion. In response the Secretary of the Treasury wrote to Senator Edmunds informing him that the ruling of the department is, that lead ore containing silver ore of greater value than the lead ore shall be considered silver ore and be admitted free. This letter Senator Edmunds indorsed as his opinion also.

"It is decidedly not in accordance with the statutes. On the contrary, the United States statutes expressly provide that on ores not otherwise provided for in the metal schedule of the tariff, a duty of 20 per cent ad valorem shall be levied."

TRIAL of the suit of Washington Smith, one of the stockholders of the Kenton Mining Company, against Superintendent C. C. Stevenson and Wales L. Palmer, a stockholder of the corporation, was begun Tuesday before Judge Wallace.

THE quicksilver mine near Oakland, Oregon, is yielding 15 flasks per month. This is the only cinabar deposit on the coast now worked outside of California.

New Mining Patents.

Three improvements in mining appliances were patented through the MINING AND SCIENTIFIC PRESS Patent Agency during the past week, brief descriptions of which will be of interest to our readers. One of these, patented by Joshua Handy of this city and O. M. Lovbridge of Weaverville (assignor to Mr. Handy), is intended to increase the capacity of the ordinary

Hydraulic Nozzle.

In the ordinary nozzle used in hydraulic mining, the elbow is provided on its forward end with a ball having an exit opening. To the ball is pivoted by trunnions a flange or ring to which the flaring rear end of the nozzle-pipe is bolted, said flaring end thus fitting over the forward end of the ball and having an up and down movement about the trunnions as a center. A packing-ring bolted between the nozzle-pipe and flange makes a tight joint. The object being to increase the capacity of the apparatus, these inventors found that with the construction of the joint as described it would not answer to simply increase the diameter of the exit opening in the ball, which has heretofore been round, for in that case, as the pipe moves up and down, the packing-ring would be exposed. Therefore the diameter of the opening on the ball is limited, but as the pipe does not move sidewise on this joint, they have found that they can obtain the desired enlargement for increase of capacity by reaming or cutting backwardly the sides of the exit opening in the ball. Now, as the pipe does not move sidewise, these additional openings or recesses do not expose the packing-ring and the pipe may move up and down as before. By this improvement they have accomplished the necessary result and materially increased the capacity of the nozzle without interfering at all with the perfect construction of the joint itself.

Rock-Crusher.

The object of the invention of Joel B. Low of this city is to provide a simple and effective rock-crusher which is easily operated and adjusted, and which can be readily cleaned in all its parts, making it specially adapted for the use of assayers and for any small work where examples are desired. The patent covers, in a rock-breaker, a stationary jaw pivoted at its top in the frame so it may be turned up when released to an elevated position. There is a removable bolt or pin behind the stationary jaws for holding it in its working position and adapted to be placed in the frame in front of it to hold it when in an elevated position. The moving jaw is also pivoted at its top to the frame and is adapted to be turned up to an elevated position and rested against the other jaw. It being possible to thus throw the jaws up out of working position, the whole machine is easily cleaned, so that when a new sample is to be crushed there is not apt to be any of the crushed previous sample remaining, as is the case where the interior is difficult of access.

Lead-Bath Apparatus for Ores.

The patent of Andrew M. Shields of North Temescal, Alameda county, is for a lead-bath apparatus for working ores. In the employment of molten lead or other metal to recover precious metals from these ores or from sand with which they may be mixed, considerable difficulty has been experienced, first, from the large surface of lead which must be exposed to the atmosphere and the consequent loss by oxidation; secondly, in the difficulty of distributing the sand so that all parts will be exposed to the action of the metal; and, thirdly, in the difficulty of separating the sand from the lead and discharging it without carrying off a considerable quantity of the lead with it. This invention of Mr. Shields is designed to overcome these difficulties. The invention consists of a pan, the bottom of which stands on an incline, while the top is in a nearly horizontal plane, and, in combination with this pan a means for reducing the surface of melted lead exposed to the atmosphere, the means for feeding the molten metal and agitating it, together with a means for discharging the refuse from the top of the lead bath without carrying away the lead itself. Mr. Shields informs us that one of these machines has been working successfully on the beach sands at Monterey bay, and that they are specially adapted for saving the fine gold in beach sand.

THE Tucson Smelting Works have passed into the hands of the Pueblo Reduction Works Co.

Diamond-Pointed Rock Drills.

The Bullock Manufacturing Co. has purchased the rights to manufacture all the styles of rock drills made under original Leschot patents, and also a large number of patents granted to M. C. Bullock, which control the latest improvements in diamond-pointed rock drills. The advantages of diamond drills are thoroughly recognized and understood. The general principle of boring is the same in all the drills made by this company, though there are slight changes in design to meet special requirements. In boring artesian or oil-wells, or in prospecting at great depth, they use a pair of reciprocating engines with cross-heads and slide valves, and a single reversing device. For underground prospecting or boring short holes, peculiar trunk engines are used.

An engraving of one of these drills, called the Dauntless, is given on next page. It is a drill of this pattern which has been doing such good work prospecting in the coal measures at Saybrook, Ill. The diamond-pointed bit, or boring-tool, is mounted on a swivel head, which can be easily turned to bore in any desired direction, and is secured in position by simply tightening one nut. The feed screws are made of best lap-welded hydraulic tubing, from four to seven feet in length, with deep square threads cut on the outside. Each of these screws has a key-seat or spline cut the entire length, by which it is feathered to the bevel sleeve gear which drives it. This gear connects with a beveled driving gear on the crank shaft of the engine which gives it a high rotative speed. On the sleeve of this gear are three spur feed gears which engage and drive three others on a small counter shaft; at the lower end of the latter is keyed a spur gear, and this in turn engages with and drives another gear, which is keyed to the cast-steel feed nut of the machine. These feed gears have a difference of one or more teeth, giving a differential feed with three combinations.

The counter-shaft is hollow and is fitted with a sliding rod having a clutch which can be set to engage with either of the three feed gears carried on the upper end of the shaft. The lower end of this clutch rod is secured to a sliding handle with detent, so arranged that the operator can shift the clutch from one feed gear to another while the machine is running, thus changing from a coarse to a fine feed, or vice versa, and adapting the cut of the bit to the hardness of the rock. The thrust of the bit upon the feed nut is received by a hardened steel conical roller-thrust bearing, which is held in place by a steel yoke resting upon two hydraulic pistons. These pistons are connected with a pressure gauge on the swivel head, which indicates the pressure of the bit against the rock. At the lower end of the feed screw is secured a chuck, through both of which pass the drill rods. The core barrel which carries the bit and core lifter is secured to the lower end of the drill rods, and on the upper end of these rods is a water joint connected to the feed pump by rubber hose. With this pump a constant stream of water is forced down through the hollow drill rods, keeping the bit cool and washing the cuttings up to the surface on the outside of the rods. The hollow bit is a steel thimble having two rows of diamonds (bort or carbon) so embedded therein that their edges project from its face, and from the outer and inner periphery. The diamonds in the face cut the path of the drill in its forward progress, while the outer and inner projections enlarge the cavity and allow the free passage of the water as above described. As the feed screw is rotated and fed forward, it turns the drill rods and bit and thrusts the bit into the rock, cutting an annular channel. That portion of the stone encircled by this channel is undisturbed, and the core barrel passing down over it preserves it intact. When the rods are withdrawn the solid cylinder thus formed is brought up with them. When a core is not required, another boring head can be used. The feed screw is made to run up 60 times faster than it is fed down. The agents for these machines on this coast are Parke & Lacy.

DURING the past year Spokane Falls, W. T., has enjoyed a first-class boom. More than \$2,000,000 has been spent in buildings, and \$224,000 has been paid out for street improvements. The city is equipped with three systems of street cars.

Concrete.

Ransome's Process.

Ransome's stone has for many years borne a familiar sound to the ears of this writer. During a lifetime Mr. Frederick Ransome, the father of Mr. Ernest L. Ransome of this city, whose process I propose to deal with in this article, has given unremitting and toilsome attention, in conjunction with Mr. Ernest Ransome, his son, Mr. Henry Bessemer and other inventors, to the production of an artificial building-stone which has almost rivaled Nature herself. In London, Calcutta, Hongkong, and I may say in the majority of British Colonial settlements, the patents of Mr. Ransome have been practically tested, and for structural and decorative purposes they are unexcelled.

In 1873, Dr. Sterry Hunt, professor of geology in Boston, said before the Institute of Technology that "he had followed with the more interest the labors of Mr. Frederick Ransome, who, after years of experiment, had solved satisfactorily and completely a great industrial problem—with the more interest because he himself had carried on, in 1857-8, a series of experiments very similar in character and in chemical results, in his endeavors to find out the method by which certain soft earthy rocks, consisting in great part of silica and carbonate of lime, have become hard and crystalline." The speaker had shown by researches in the laboratory, and also by observations of limestone strata in the vicinity of eruptive rocks, that a reaction between the silica and carbonate of lime takes place in the presence of carbonate of soda, by which the alkali brought about, little by little, the solution of the silica and its union with the lime to form a hard silicate of lime. This is Nature's method. Too action of alkali in dissolving the silica and then giving it up to the lime, was an example of many of the so-called actions by presence, which are really cases of chemical affinity, acting under peculiar conditions. It was reserved for Mr. Ransome, by using both the lime and the silica in their free, soluble and active forms, and by bringing in the alkali already combined with a portion of silica, to make this curious action very rapid, and to show that the product forms a cementing material which is available for binding particles of sand into hard, stonelike masses.

Here we come to the secret of the hardening of cements—the small amount of alkali used by Mr. Ransome in the process itself, united with the successive portions of silicates of lime formed, thus becoming locked in an insoluble compound, as we see every day in granite rocks. It is a generally accepted view at the present time that the hardening of hydraulic and Portland cements is in a great measure due to the transferring power of a small portion of alkali which such cements are found to contain.

The application of Fuchs' invention made nearly 70 years ago, of the adhesive compound of alkali and silica, called "water glass," was the next step in the evolution of artificial stone, Mr. Ransome making it available by the discovery of chloride of calcium as a fixing agent.

The next step was to use such materials for cement as would themselves become insoluble, and require no after-treatment with chemicals. This was effected by adding to the ingredients hydraulic lime and active silica, the silica being in time transferred through the agency of the alkali to the unsaturated base of the hydraulic lime, while soda itself unites with the silicates of lime to form an insoluble double silicate of lime and soda.

We have here a double advantage: First, the richness of the material in combined silica as an admirable addition to its resistance to atmospheric and abrading influences; and second, the acceleration of the hardening process to a few hours by the use of water glass.

As regards strength, this stone was proved to resist a crushing force of 9000 pounds to the square inch. Dicks were also made of the material, which were used as millstones and grindstones. Combined with emery, the artificial stone when made into a disk for saw-sharpening would, when only one fourth inch thick, cut a saw-blade an eighth of an inch thick at the rate of six inches per minute.

"Ransome's hydraulic cement," composed of furnace slag (which consists of silica, alumina and lime), was an outcome of the discovery made by Mr. Charles Wood of the Tess Iron Works, who in the year 1873 obtained a patent for granulating the previous refractory slag by running it into water. The analysis of slag was: Silica, 38.25; alumina, 22.19; lime, 31.56; magnesia, 4.14; calcic sulphide, 2.95; and protoxide of iron, .91. An especial advantage derived from the use of slag sand in the manufacture of cements is the avoidance of the usual severe burning. It is admirably adapted for use in the construction of fireproof concrete.

The concluding portion of this article will consist of a description of the means taken and the process adopted by Mr. Ernest L. Ransome of this city in his concrete constructions. The discovery of the safe and effectual combination of iron and concrete has promised such great and beneficial results to the building world—the safety from fire, from rust, and its cheapness and lightness—that prejudice against, and ignorance of, its merits can have the sympathy of no intelligent man.

Mr. Ernest Ransome has taken out many patents during late years through the MINING AND SCIENTIFIC PRESS Patent department, and has

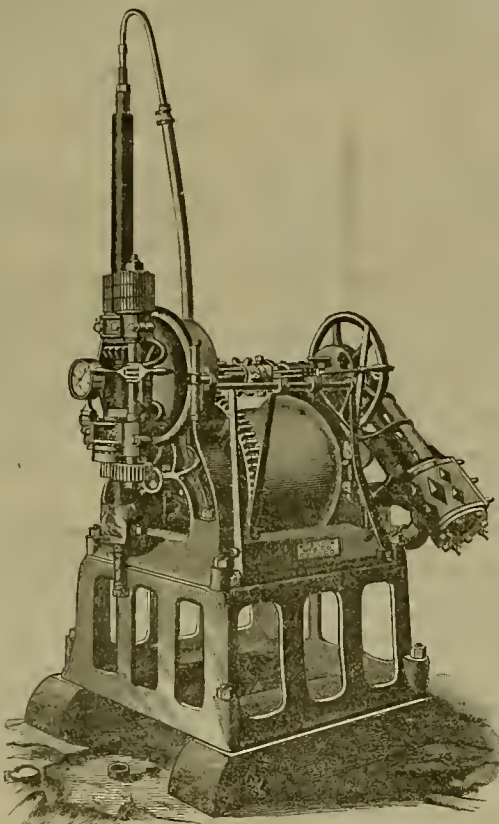
done much to further the practical development of concrete constructions on this coast.

The first and most important desideratum in the manufacture of concrete is the securing of a proper mixing of the aggregates and Portland cement. Drawings accompany the present description of his process. In two of them we have the "mixers," which he has found most

to see the thorough manner in which the mixing was accomplished.

With simple horse-power, three men and a boy can turn out 1700 cubic feet in one working day. The machine can be had for hire, so that the cost of purchasing is converted into a charge of \$2 per day to the hirer.

In Fig. 2 is seen an improved mixer which is



THE "DAUNTLESS" DIAMOND DRILL.

useful, and on which he has obtained patents. Without a proper machine, the work cannot be thoroughly and cheaply accomplished.

The cubical iron box in Fig. 1 of the accompanying engravings is partly filled with the cement and aggregates, the cement being of the finest quality and ground to a very fine powder so that it shall come in complete contact with

so constructed that its motion is a continuously revolving one (the cubical box necessitates a constant opening and shutting of the door in its side for the purpose of filling and emptying it). The power is derived from a small steam engine. At the side presented toward us can be seen the scoop by means of which the ingredients are carried into the revolving wheel.

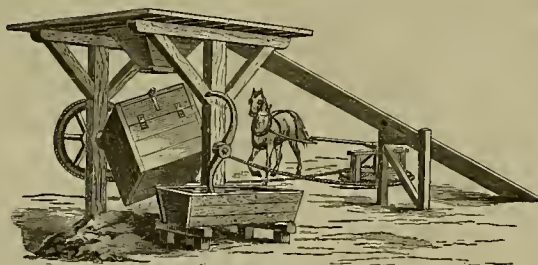


Fig. 1.—CUBICAL BOX MIXER.

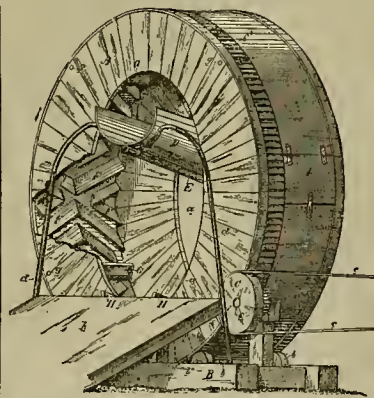


Fig. 2.—CONTINUOUS MIXER FOR CEMENT.

every portion of sand and broken rock; 640 to the square inch is the size of the mesh which grades English Portland cements. The Germans are grinding a poorer cement even finer, and as a consequence some brands from that country are making good headway in the market.

Water is admitted to the cubical iron box through the axle; for this hollow axle Mr. Ransome secured the patent. Six of these machines are being run by steam-power for the purpose of mixing the concrete as used in the dam for the new Spring Valley reservoir. Mr. H. Schnesler says that they have given the utmost satisfaction, and the writer was lately enabled

to see the thorough manner in which the mixing was accomplished.

Mr. Ransome has given much attention to the construction of a cheap and secure pavement, arched over a cellar or otherwise, especially important in a city like San Francisco, where in many places of its business portions large cellars are much in request, and where the amount of goods recklessly piled up on the sidewalks must amount to many tons.

There are two patents for this also. In the first the arch forms the pavement, the joint being over the iron beams, the surface marked with artificial flags. In the second, there is a joint especially adapted to allow for settlement; on either side of the upper portion of the beam there is left a small space, and adjoining this girder a recess is formed in the pavement. This latter can be filled in when the pavement has settled, and as it is uniform with the marking of the pavement, it is imperceptible.

Well Construction.

In contriving a simple mold for the walling up of a well with concrete, Mr. Ransome has met a long-felt want. The cleanliness and lasting power of a well so constructed are advantages which, were the cost greater instead of less than bricks, can be appreciated by the most inexperienced.

The woodwork of the mold is so arranged that any carpenter can put it together in two days, even though it be for a reservoir 50 feet in diameter.

It will last an indefinite time, and the small amount of iron used in its construction costs less than \$20. The mold, of which a drawing is given, can also be changed from one size to another.

The latest patent applied for by Mr. Ransome was that of imbedding twisted iron bars in concrete. It is now an established fact, and, strange to say, a newly discovered one by Mr. Ransome, that an iron bar when twisted without heating is increased in strength upward of 30 per cent. In this last patent there is a great improvement upon Mr. Hyatt's invention, where the bars or blades were perforated at every few inches, and anchored by short rods or wires threaded through the holes, which latter would tend to weaken them—a further disadvantage being the difficulty of making it perfectly fireproof.

Mr. G. W. Peroy, in a paper read before the Technical Society of the Pacific Coast, said that while Mr. Jackson's late experiments in the strength of iron and concrete were being conducted, "Mr. E. C. Ransome, also a member of this society, and a very successful maker of concrete, was experimenting with a different method for the purpose of obtaining the same result."

"For several years he had used old wire cables as a band in concrete walls, the irregularity of the wire ropes, caused by the twist of the strands, preventing the possibility of slipping when imbedded in concrete. This probably suggested to his mind the idea of twisting square bars of iron or steel and imbedding them in the bottom of concrete girders or flat slabs."

"It was evident that this method would be a great improvement over that invented by Mr. Hyatt. The twist in the bar would cause it to be held securely at every point along its length, instead of at intervals of several inches; no metal would be lost by punching holes, and no extra iron required for anchors. The labor of twisting cold rods would be but a trifle, and the entire sectional area of the iron could be placed just where it would be most effective."

"Mr. Ransome promptly patented his improvement, and since 1885 it has been used quite extensively in this city."

For withstanding dampness, concrete is admirably adapted; for withstanding heat and fire, even better. The comparative expansion on the application of heat to iron and concrete is: For iron, .0014; for concrete, .00137, at 180°.

Iron and concrete can be used together without any ill results from the deflection of the former or the rigidity of the latter. The most intense heat has no effect in destroying that homogeneity.

I may add, for the information of those who desire more practical information on the subject, that Mr. Ransome's fireproof construction can be seen in the following places:

Masonic hall, Crown Mills and Insane asylum, Stockton; Brown & Wise's large wine cellar, St. Helena; also, the following buildings in San Francisco: Sub-Treasury, Union Iron Works, Riedon Iron Works, Fulton Iron Works, Starr & Co.'s large Flour Mill at Port Costa, Arctic Oil Works, Bank of California, building corner Stockton and Washington streets, Starr King building, Langley & Michaels' building, Sheldon building, Wells, Fargo & Co.'s new building, Commercial wire Works, Light Works and California Wire Works.

WM. G. HODSON.

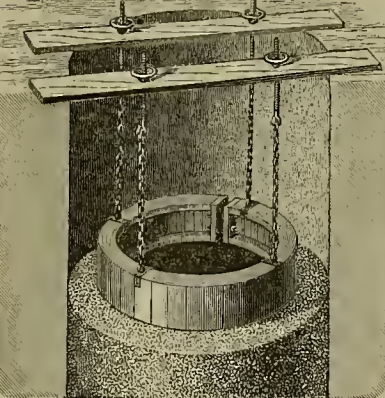


Fig. 3.—MOLD FOR CONCRETE IN WELLS.

Within this wheel are a series of hinged iron plates which are connected with the machinery so that a flapping and scooping motion is constantly kept up. By a simple device the motion of these plates can be reversed so that their motion backward and forward within the revolving wheel contributes to a thorough and even mixing of the materials. These, when mixed, come out in a ready flow at the other side, ready for wheeling away for immediate use.

The machine is made of different sizes, from an output of 1000 to 15,000 cubic feet per day with from three to six men.

MECHANICS' INSTITUTE LECTURES.—At a meeting this week of the trustees of the Mechanics' Institute, a communication from President Horace Davis of the University of California was read. In it Mr. Davis suggested that a course of 16 lectures should be given by four professors of the University—Prof. B. Moses, four lectures on American History; Prof. Wright, four lectures on American Literature; Prof. Joseph Le Conte, four lectures on Geology; and Prof. John Le Conte, four lectures on Light. After some discussion, the matter was referred to the Lecture Committee.

Labor Organizations.

A Much-Needed New Departure Originated.

The labor problem is one of the most difficult and important of any with which this country has to deal. It has been discussed by able and well-meaning men from all points, and by those occupying various positions in life; and yet the whole question still remains as much in doubt as ever. It is truly a many-sided subject, with good reasons to urge all around.

We believe in the progression and elevation of the laboring man. He is entitled to every reasonable consideration and advantage compatible with the existence of the conditions of laborer and employer. These are conditions which can never be wiped out. Under them it must be evident to every thinking mind that those who class themselves as laborers—as workingmen—are the ones who can least afford to place themselves in needless antagonism with capital. Hence it is to be regretted that such an open and bitter hostility should exist between the two classes as has been growing up within the last three or four years.

The Mistakes of the Past.

There is no objection to labor organizations. They are perfectly right and proper when properly conducted, and should be sustained; but it has ever been found a difficult matter to organize large masses of human beings for any purpose in a short time, even when officered by the very best of men. Hence it is not to be wondered at that the attempt to organize and put in active operation from a half to three-quarters of a million of men, scattered through almost every State and large town in the Union, should meet with grave difficulties. The rank and file, as a general thing, were inexperienced and uneducated in matters of comprehensive organization, and it was perfectly natural that among the leaders should be found many who were reckless and ambitious, and who, in entering upon an aggressive warfare, should, by their incompetence and lack of judgment, lead the organizations into mistakes and disaster. Such, unfortunately, for both the laborer and employer, has been the result. There is no occasion to enter into details in this matter. The facts are known and read by all. The uncalled-for and unnecessary strikes of the past two years; the terrible sufferings which they have imposed upon thousands of families; the stopping of the wheels of commerce suddenly and without notice; the great damage to the public at large, which has fallen with far greater force upon labor than upon capital; the forcing of men with families to stop work against their will and interests, are things which cannot be tolerated in a free Government, where each is so dependent upon the other in the performance of needful labor and social duties.

The great body of the workingmen of this country may be misled for a time by reckless leaders, but they have sufficient intelligence and patriotism to soon get their eyes open, and on the second sober thought, to strike out for the right. This has been the result of the mistakes of the last two years, and now these reckless leaders are being sent to the rear all along the line, while their places are being filled with men of better judgment, who think more and talk less.

The Labor Convention at Indianapolis

Which recently adjourned, as the representative body of the Knights of Labor, has fully vindicated the honor and intelligence of the American working people in sustaining General Master Workman Powderly in his honest and earnest endeavor to secure a just and honorable administration of the affairs of the organization of which he has long been the head. Notwithstanding the most determined efforts on the part of the reckless minority opposed to him, he has most signally triumphed over his opponents and has been fully established in his position as head of the Order for another term, with the added privilege of henceforth choosing his own cabinet advisers. His chief opponent and late lieutenant, Thomas Barry of Michigan, has been ignominiously expelled from the Order by a decided vote of 123 to 24. On its being ascertained that, owing to the troubles and consequent falling off of membership of the K. of L., that body was in some pecuniary straits, the representatives of the Glass Workers' Assembly of Pennsylvania, the wealthiest, most conservative and most influential local

labor organization in the country, promptly came forward and offered all the money that was necessary to carry on the affairs of the Knights of Labor, to the extent of \$100,000. This offer was promptly accepted, and as the organization is now placed upon a sound financial basis, it is to be hoped that it may soon be also permanently established as a thoroughly useful and beneficial Order. To accomplish this end, some modifications in the rules and practice of the Order have been adopted.

The K. of L. as It Was and Is to Be.

The organization of the Knights of Labor, from whose past misdirected influence so much of evil has been experienced, and from whose future action so much of good may be expected, was formed some eight years ago for the purpose of obviating strikes by the adoption of some means of arbitration as a plan for settling disputes about wages, hours of labor, etc. So beneficial an object naturally commended itself to the approval not only of the workingmen throughout the country, but of employers as well. The Order grew rapidly and soon attained a membership of fully 800,000. The great mistake of the organization grew out of the fact that no power was lodged in the central body to control local assemblies, more particularly in the matter of strikes. Consequently strikes, in many cases, were ordered instead of being averted. Arbitration was about as often declined as courted, at least until the mischief of an unnecessary strike and all its concomitant evils were set on foot. The intervention of Master Workman Powderly pleading for a more loyal adherence to the organic principles of the Order was disregarded and often contemptuously spurned by some of the more reckless managers of the local organizations. The natural consequence was a long and bitter series of conflicts between both labor and capital, and between the local and central organizations of the Order. As a result of these differences, the Order became badly demoralized and with a depleted treasury, the membership fell off in about 18 months from 800,000 to less than half that number. The trouble first took tangible shape at the General Assembly held a year ago in Richmond, Va., and finally culminated at Indianapolis, where Mr. Powderly, who, as much as any man in the country, holds the welfare of the wage-worker at heart, has made a complete triumph over his own and the workingmen's most dangerous and persistent enemies. It is to be hoped that since the organization has now been thoroughly purged of the disaffected and reckless element in its leadership, it will soon regain the most of its lost membership and hereafter exert a healthful and highly beneficial influence over the general labor organizations of the country.

ZELLERBACH'S SUIT.—After a trial lasting over two months, the jury in the case of Mark Zellerbach against M. Allenberg and E. L. Goldstein has returned a unanimous verdict for the defendants on each of the 74 special issues on which the case had been presented to them. The case involved the title to mining property valued at several million dollars, which has been in litigation for many years. Allenberg was formerly the confidential agent and manager for Zellerbach, and it was charged in the complaint that he sold the products of the mine and gave the money to Goldstein, who in turn loaned the money to Zellerbach on his mining property. When the loans became due, Zellerbach's property was attached and was bought in by Allenberg and Goldstein. He charged that his former agent Allenberg conspired with Goldstein to defraud him, but the jury found that there was no foundation for the charge of fraud.

MINING COMPANIES SUED.—P. J. Kenna, as a stockholder in several companies, has brought suit to recover \$1000 in each case against the directors of the Mount Diablo Mill and Mining Company, of the Chollar Mining Company, and also of the Potosi Mining Company, for failure to publicly post the monthly financial transactions, as required by law.

THE State Mining Bureau Museum has been the recipient of a present of a large collection of shells from J. Z. Davis. The shells are from the seacoasts of various countries, and there are several thousands of them. Among other additions to the museum is a box of Toltec mummies from New Mexico.

Coast Industrial Notes.

CALIFORNIA OIL.—A Pennsylvania oil expert says: There is more oil under the soil of California than in all of Pennsylvania.

DREDDING OAKLAND HARBOR.—Active work will soon be once more commenced in dredging Oakland harbor. The sum of \$350,000 is the amount of the present appropriation.

BRICKLAYERS SCARCE.—It being impossible to find bricklayers out of employment on the Pacific Coast, the contractor for the new public building at Carson imported his force from the East.

ALAMEDA SALT WORKS.—The U. P. Salt Works at Mount Eden, Alameda county, are loading from two to three schooners a day with salt, of which they have now about 20,000 tons on the grounds.

ICE MEN all along the Truckee river are now prepared for their winter harvest. Several of the companies have enlarged their storage capacities. The new ice-house at Essex is about completed, as is also the additional one at Ouba.

A NEW V FLUME IN EL DORADO.—A surveying party is now at work a little northeast of Placerville, and it is reported that they are laying out a line for a V flume to convey the waters of Silver creek to Folsom, for the purpose of floating wood, etc.

BOX FACTORY AT VERDI.—O. Lonkey has commenced the construction of a box factory at Verdi. It will be one of the largest on the Truckee river, and give employment to a large number of hands, adding much life to this already wide-awake and prosperous camp.

STEEL SUPERSEDING IRON.—Eight hundred tons of American steel rails, which recently arrived from New York for the Southern Pacific Company, are being forwarded to the Roseburg division of the Oregon and California Railroad, and enough more are coming on three ships to replace all the iron rails on the road, and give a continuous steel rail from Portland to San Francisco.

NEW FOUNDRY IN NEVADA.—Wm. H. Martin, Robert Martin and Dave Muir, Jr., have commenced the construction of a foundry and machine shop at this city. The site selected is the Stiles lot on Spring street, in the rear of the Methodist church. The engine, tools, etc., have been ordered and will soon arrive. The company will make a specialty of furnishing mining machinery, so says the Nevada Transcript.

REMOVAL OF DUNCAN'S MILLS.—These mills have recently passed into the hands of a syndicate, and it is now in contemplation to remove them to Petaluma, that being the most favorable point on the line of water navigation with San Francisco. There everything could be utilized. Sawdust, slabs and oil refuse stuff could be made to pay a profit. It is believed that this arrangement will be accomplished in the near future.

FLOURISHING.—Rocklin, Placer county, is a lively town, according to the Sacramento Bee. The two hotels there are crowded every night and another hotel is in process of erection. At Rocklin, they are getting out the granite for the new courthouse at Stockton, and the contract caused the employment of one hundred additional quarrymen. All the towns in Placer county, along the line of the Central Pacific Railroad, seem to be flourishing.

SHIPPING HOUSES FROM THE EAST.—Several houses, all ready made, and only needing to be put together, have recently been received at Los Angeles from the East. This is a somewhat suggestive matter. Our lumbermen must be prepared to compete with the lumbermen of the Northwest, or their occupation will be seriously interfered with. Just now, lumber is very low, so low, in all probability, as to preclude any such further importations. It should be noticed that labor is also an important factor in this new business venture.

BORATE OF LIME.—It has long been known that a deposit of borate of lime existed in Curry county, Oregon, but it has only quite recently been known that it was of vast extent. The deposit is a dry one, in a bluff directly upon the ocean shore, and in a locality very convenient for shipment. The deposit, it is said, has been traced for half a mile, and is 300 feet wide and 30 feet deep. If the accounts of this discovery are to be relied upon, this is the most valuable deposit of this kind on the Pacific Coast, or anywhere else, in fact. The convenience for shipment is an important factor in connection with this discovery.

THERE seems to be an unusual activity manifested just at this time in all the various industries. The old works are being enlarged, and new industries being established all through the State. There is the promise of a larger influx of visitors from the East this coming season than has ever before been known, and a much larger portion are coming to stay. The present outlook for California is most especially encouraging. The recent election registration and the vote cast has developed a much larger population in

the State than had been supposed to exist here. The same is true of the country at large. The latest estimates are that the next census will reach very nearly 70,000,000. This would give an increase of nearly 20,000,000 in ten years.

ERECTING THE PLANING-MILL AT BERKELEY. Preparations are being made in West Berkeley for the erection of some large planing mills. Nichols & Co. will be the owners. A lot directly upon the water-front has been graded and a bulkhead is now being built to prevent the sea from washing away the earth. The mill will be 100x125 feet and two stories high. A floor made of concrete, eight inches thick, will be laid, and the latest improvements in machinery will be made to the mill they now are running. It is also their intention to build a wharf for the accommodation of their business.

THE CANNERS.—There are indications that the canners are about to suffer a raid from a patentee of the soldering process which is universally used for closing cans. It is said that the royalties in prospect amount to \$50,000,000, and one may expect a repetition of the scenes which attended the enforcement of the Good-year rubber patents. This fear comes from a verdict rendered on the 22d of last month in Boston by a jury in the United States Circuit Court, said to involve the collection of millions of dollars in royalties annually from the canners of fruit, salmon and other commodities in the United States for the use of soldering iron. The case was made a test. The verdict was at the rate of \$187.50 per 1000 cans on which the soldering iron was used by the defendant. This decision, it is said, will open the way to suits against a majority of the fruit canners of the country.

REDUCTION WORKS IN SAN DIEGO.—According to the National City Record, all the machinery has been received for the establishment of Reduction Works at National City, and the works have been started. The building contains four floors, and the ore, which is deposited on the upper floor, passes, during the different stages of the process of reduction, successively downward to the lower floors, until the refuse reaches the vast dumping-grounds in the rear of the establishment. An invoice of ore has been received from San Bernardino county, and contracts have been made with a number of other parties for supplies of ore, which will follow in intervals so as to keep the Reduction Works busy continuously for many months to come. The handling of the ore, the operation of the machinery and other work connected with this establishment, give employment to over one hundred men right along, and when the large refinery, with its big smelters, scales and furnaces, which will immediately be built, in connection with these works, is completed, the number of employes will at least be doubled, and National City will have one of the completest plants of its kind in existence.

BOLT MAKING IN SAN FRANCISCO.—Nearly fifty people are employed in a local bolt factory on Mission street. Bolt-making, says a contemporary, as a distinct industry has attracted little attention here that there are doubtless many persons in this city who have never before heard of the existence of such an establishment in San Francisco. But although quietly conducted, the works are really of great importance, and they add another proof of San Francisco's advance in the industrial world. The establishment was founded in 1871, when everything in the line of bolts was obtained from abroad. Success has attended the efforts of the manufacturers, although at the start it was dearly won, as outside competition was strong. The products of the works have for some years past been supplying the local trade, and have also been shipped as far East as Utah and adjoining Territories. They have also been sent to the islands of the Pacific in great quantities, as well as to South America. Great superiority is claimed for the bolts made in this city, and they are said to be of such good quality that they never break under ordinary usage. Carriage bolts are the specialty of the establishment, and these are made in large quantities.

FURNITURE FACTORY AT RANDALL, LOS ANGELES CO.—A reporter of the Los Angeles Times recently made a tour through the above establishment, and found that important changes and improvements had recently been made in the factory. The reporter remarks that it is very evident that the factory officials and the operatives thoroughly understand their business, for every man is kept busily at work, and there is no time lost. Wood is taken from the dry kiln and taken to the sawyers; then it is run through the planers and surfaced, then taken to the band and jig saws to be cut out on the patterns, thence to the chapers and sand papering machines; if the wood is for tables the legs are turned on the lathe; the wood is then sent to the carver, thence to the men who set it up—put the pieces together—thence to the upholsterers and then to the finishers. And the beauty about it is that this work is going on continually, making a steady stream of wood from the lumber-yard to the shipping-room. The shaving collector is a great institution. In the basement is a double fan that creates a severe suction on one side and a blast on the other; large pipes are run from each machine collecting the shavings and sawdust and conveying it to a reservoir over the boiler; the dust is thrown out of the collector, and nothing but the clean wood is left; this drops into an au-

tomatic feeder into the fire-box, thus doing away with a fireman, for the refuse at the factory is enough to feed the boiler. The establishment has a first-class designer, and he is getting out some beautiful pieces of furniture. Every man in the building thoroughly understands his business, and there is some beautiful furniture being turned out.

EXTENSIVE BRICK-MAKING WORKS.—The *Livermore Herald* of a recent date says that Messrs. Remillard & Co., proprietors of the extensive brickyards near Pleasanton, are now making arrangements for the erection of a mammoth patent kiln in which the manufacture of brick may be carried on throughout the year, instead of only during the summer months, as at present. The building will consist of a series of twenty furnaces, inclosing a circular court, from the center of which will rise a high chimney. The diameter of the whole will be one hundred feet. The outer wall will be nine feet thick and about twenty high; the inner of nearly equal height but not so thick. Each chamber will have a frontage of twelve feet and a depth of twenty. The chimney will be 130 feet in height. Each chamber will have a flue communicating with this chimney. The brick will be burned in the chambers, and once started the work never stops—some burning, others being filled and others emptied all the time. Coal will be used for fuel instead of wood. Two extensive storage sheds, each of a capacity of 2,000,000 brick, will flank this mammoth kiln. The capacity of the kiln will be about 8,000,000 a year. This will be in addition to the present work of the yard, which will go on as usual. The present output is about 11,000,000. The new works will go into operation by the first of May next.

BET SUGAR A SUCCESS.—Claus Spreckels is meeting with the fullest success in his Watsonville sugar enterprise. He is satisfied and enthusiastic. From the first he has been confident of the success of the beet-sugar industry in California, when properly managed, and the beet modern mechanical appliances, and the product that is being turned out daily only serves to bear out his predictions. The first shipments of crude sugar came from Watsonville to the Portrero refinery about ten days ago, and trains have since been bringing carloads daily. The beets produced about Watsonville are proving very satisfactory. One farmer whose beets contained about 22 per cent saccharine matter will net \$8 a ton for his crop. When the seed was distributed the farmers were guaranteed \$4 a ton, but few anticipated they would realize double that figure. That the project is as much a success as could be is unquestioned. The understanding now is that when the busy times are through at the factory, Mr. Spreckels will think matters over and arrange for the location at one or two favorable points in the State of other plants for the carrying on of the industry in which he has such confidence. It has ever been the boast of this millionaire sugar refiner that he was trained to labor, and no one who has seen him at his factory during the first work of beet crushing can wonder that such earnest activity has brought him success. Dressed in old clothes, surrounded by the necessary dirt of the factory, he has set all his workmen an example of industry. The pulp which is left after the saccharine juice is expressed is used as cattle food. About seven carloads of pulp are being shipped daily from the beet factory to Henry Miller, Gilroy. Farmers who have fed pulp to their stock are well pleased with it. Cattle like it, and it is fattening feed. Beet sugar is the great coming industry of California.

A NEW INDUSTRY—TERRA COTTA LUMBER.—The International Terra Cotta Lumber Company has its headquarters for the Pacific Coast at Los Angeles. Its representative here, Mr. T. P. Lawrence, was recently in San Diego, looking into the advisability of establishing branch works there. Terra cotta lumber is a new building material, for which patents have been taken out covering the world. The name indicates the character of the material. It is made of fireclay and sawdust, in proportions of two-thirds of the former to one-third of the latter, and is burned in lengths of several feet, in form resembling sawed timber or dimension stuff, or in brick or block form, as may be desired. The wooden ingredient burns out, leaving a porous brick less than one-third the ordinary weight. The advantages claimed for this lumber are numerous. Among them, indestructibility, non-conduction of heat, cold and sound, dryness, lightness, ease of tooling, permeability to nails. Its porous surface also makes a prime anchorage for plaster and cement. Its fireproof quality makes it desirable as a means of reducing cost of insurance. It does not expand or contract with heat or cold. Can be heated white hot and cold water thrown upon it in that condition will not break it. It is said to be cheaper for house-building than lumber at \$16 per thousand. In the immense building in Chicago, where the National Republican Convention was held, \$180,000 worth of this material is being used for ceilings, etc. There are factories in Europe, Canada, Australia, and about thirty-six in the United States. There is also one at Los Angeles. There is an immense deposit of clay at Elsinore, directly upon the line of the Elsinore and San Diego Railroad now being constructed, which is used in this manufacture. There will soon, no doubt, be a factory for the manufacture of the new material started at San Diego.

COTTON AND WOOL.

Cotton Manufacturing at the South.

There appears to be a constantly increasing activity in the cotton-manufacturing interest of the South. Georgia and the Carolinas appear to take the lead. All through those States the capacity of existing mills is being increased and many new mills are being built or planned. There is also a gradual widening of the character of the manufactures being produced—more fine goods are constantly being made.

One of our exchangers makes an enumeration of a large number of mills that are being enlarged, and of new ones in progress of construction. The time when this enumeration was taken was during August and September—the two dullest months of the year. Among the new mills being built are the following:

In Georgia, the Richmond Co., near Augusta, is building a second mill with over 3000 spindles; a mill is being built at Newnan; the Paragon Co. at Columbia is building a mill to make fine ginghams; a mill is under contract to be built at La Grange; a 3000-spindle mill is just being started at Dallas, and a new mill in contemplation at Macon.

In South Carolina a \$100,000 mill is being built at Chester; one at Cowpens, and another at Seneca.

In North Carolina a \$100,000 mill is being built at Pineville, and another of the same capacity at Kotherfordton; mills will also be built in this State at Forest City, at Morgantown, at Fingerville (with 5000 spindles), at Iron Station, at Laurel Hill, and at Gibsonville.

A \$100,000 mill is going up at Lynchburg, Va., and one of same capacity at Enfield, Ala.

Three new knitting factories are also reported—one at Union Mills, Va., to employ 100 hands, and one each at Charlotte and Tarboro, N. C. These are all in addition to numerous enlargements of existing mills, and many others are supposed to be under construction or early establishment at other places. This information furnishes abundant evidence of the rapidly increasing industrial growth of the Southern States. There was never a time when such industries were more rapidly increasing at the North.

American Wool.

Qualities—In What Localities Produced and In What Amounts.

Everything relating to wool production in the United States has special interest just now. Questions concerning the amount produced, quality, classes and uses having been referred to Mr. J. R. Dodge, statistician of the Department of Agriculture, he answers:

The first of the three classes is clothing wool. This is the fleece of full-blood and grade merino, of fine, short fiber, remarkable for its felting quality. These wools are prepared for manufacture by carding rather than combing. The highest type of this race, the registered thoroughbred, is found in Vermont, where breeding flocks are more numerous than elsewhere, and in considerable numbers in Western New York, Ohio and Michigan, and scattered throughout the Western States.

The merino type of wool prevails almost exclusively in the three States named, in Texas, and throughout the Rocky mountains and Pacific Coast areas. Few sheep of other blood are found west of the Missouri river.

Western Pennsylvania and West Virginia furnish wool of the merino type mainly. The seaboard States of New England also furnish some grade wools of this type.

The second class, the combing wool of the tariff classification, includes the medium and long wools of the English breeds, the Cotswold, Leicester, Lincoln, several families of Downs, and other breeds of long and coarse wools, also popularly known as the mutton breeds. These are few in number compared with the merino type. Nearly all the sheep of the South, exclusive of Texas, are of this class, mostly descendants of less improved English sheep of a hundred years ago, with occasional infusions of better blood from England, Canada, or the Northern States. In Kentucky probably 99 per cent is the combing-wool class. A considerable portion, too, is highly improved, giving to this State the reputation of having a larger proportion of high-quality mutton sheep than any other State.

In the vicinity of the Atlantic cities, from Maine to Virginia, sheep husbandry is principally lamb production, the males being downs or other English breeds, and the ewes grades of both merino and the English types. This combination produces a mixed wool of a useful character. Then there are considerable numbers of the English breeds, though fewer than merino, scattered through the Western States, from Ohio to Kansas, and a still smaller proportion on the Pacific Coast and in the Territories.

As to the third class, the carpet wools, they are represented in the United States only by the Mexican sheep, which are the foundation of a large proportion of the range flocks, but so improved by repeated crosses as to furnish wool of the merino type, much of it of high grade.

It is also stated that the carpet-wool product of the United States is almost exclusively the fleece of sheep of Mexican origin, which are raised chiefly in Texas, New Mexico, Arizona, and certain other Territories of the mountain region of the country situated between the Mississippi valley and the Pacific Slope.

The imports of combing wool into the United States are chiefly English long wool, which enters into competition with the delaine or combing merino wool produced in this country.

As to relative quantity of clothing, combing, and carpet wools, respectively, produced in the United States, Mr. Jas. Lynch of New York, a recognized authority on wool statistics, writes under date of Sept. 26, 1887, as follows:

Iowa, Missouri, Minnesota, and States east of the Mississippi, except lower Southern.....	160,000,000
California.....	40,305,000
Oregon and other Western States and Territories.....	56,000,000
Colorado and New Mexico.....	21,000,000
Texas.....	26,000,000
Georgia, Lake and Southern.....	16,000,000

Total.....322,305,000

With the improved combing machinery now in use, nearly all of the first mentioned 160,000,000 pounds could be passed through the combs, and so also could a small portion of the 40,305,000 pounds of California, and perhaps five-eighths of the 56,000,000 pounds of Oregon and other States and Territories. A good deal of the 24,000,000 pounds of wool from Colorado and New Mexico can be combed, but very little use is made of it for that purpose. There is a small portion of the 26,000,000 pounds of Texas and the 16,000,000 pounds of Southern that could be combed, but hardly any of it is used.

All the wool can be used for clothing purposes, harring a trifling quantity of hairy and kempy, which comes chiefly from Colorado, New Mexico and Texas.

It may be said that the coarse wool from any section may be used for carpets. No one has embarked in the business of growing carpet wool by itself, nor is there any likelihood of its ever being done.

A considerable portion of the wool product of this country which, according to the tariff now in force, is classed as clothing wool, has, by comparatively recent improvements in machinery, been rendered susceptible to the combing process, and thus has been utilized in the manufacture of worsted goods, embracing certain higher grades of wearing apparel, women's and children's dress goods, as well as fabrics for men's clothing. Such wools, though in the trade regarded as combing wools, under the terms of the revenue-law tariff, would be classed as clothing wools.

COVERING FOR COTTON BALES.—The manufacturers of jute bagging for cotton will, from present appearances, go into some other business in the near future. They doubled the price of jute bagging, thinking, not wisely, that there was nothing else that would serve the purpose. But it has been demonstrated that jute is only one of a dozen materials of which bagging for the purpose named can be made. If the outcome is that the jute men are left in the cold, the verdict will be, served them right. It is an unwise proceeding to kill the goose that lays the golden egg. Pine straw bagging made from the needles or leaves of the pine tree finds favor among merchants and shippers at Charleston, and it is predicted that before another season 100 factories will be engaged in its manufacture in North and South Carolina. Wire gauze has also been recommended as a covering equal to jute bagging, having withstood the severest tests when exposed to fire, and the subject is being favorably considered at the New York Cotton Exchange.

THE INCREASING DEMAND FOR COTTON AND IRON.—Not very many years ago people wondered what on earth the world was going to do with the constantly increasing yield of our Southern cotton crop, which then had reached an annual output of 2,000,000 bales. But the world found use for it all, and now finds use for our 7,000,000 bales. The people of the South went to manufacturing the staple after awhile, and thought they would soon close every Northern mill. They have not done it thus far, nor are they likely to do it. The manufacturing interests of the North will continue to increase, and so will those of the South, and the world will find use for the constantly increasing product. Just so the world will find use for all of our iron, as it did for our continually increased cotton crop. In the meantime the blast furnaces of the North will continue for a long time to furnish her share of the product, and the same business will continue to increase at the South.

COTTON MILLS IN JAPAN.—The number of cotton-mills in Japan two years ago was only about 8 or 10; now there are 21. Considerable interest has sprung up in that country in this industry since its introduction.

BOOT AND SHOEMAKER.

Improvement in Leather Manipulation.

A new system of connecting several thicknesses of leather, either in making double or triple thicknesses of leather belting or in affixing the soles of boots to the upper, is being introduced into England, where machines are being exhibited as used for attaching the soles of boots. The new system partakes more of the character of riveting than any other known method, the new rivets being made of metal-covered wax thread. Each fastener is thus a tubular rivet filled with firmly inclosed wax thread. One of the chief objects of this tubular rivet or piece of metal-covered thread is a firm fastening, with greater flexibility than has

hitherto been obtained with machine work. It would be impossible to explain the construction of the machines used without drawings, but we may say that the covering process is performed on a machine in which a strip of brass is pulled through dies which inclose the wax thread fed to them. The tube-covered thread from this machine passes to another in which the tube is roughened or corrugated circumferentially by small rotating disks with fine teeth. The corrugation helps to give the fastener a firm hold, and also to make it more easily flexible than it would be if the metal tube were plain. The edges of the strip are not soldered or brazed so as to make it into an actual tube. Boot soles are affixed in a few seconds by another machine which pierces the leather out off a length of the metal-covered thread, automatically adjusting it according to the thickness of the leather being fastened. The covered wax thread is then driven vertically into the sole of the boot. It thus presents an end-wearing surface; the brass covering, as the leather wears, burrs over, forming a head on the outside of the sole, and prevents its working into the foot, an objection which attaches to other metallic fastenings.

Changes in Shoe Manufacture and Styles.

Skilled labor in shoe manufacture has been greatly reduced by the introduction of machinery into the business, and the production of cheap shoes has been increased in proportion. This inexpensive mode of turning out footwear has at length been subjected to such keen competition, and the product consequently as reduced in real value, that it is said by a Philadelphian experienced in the art that the best opening for a shoe manufacturer to-day is on hand work. People are willing to pay for what may be called exclusive style. A welt shoe, bottomed and finished by hand, will probably cost 15 cents per pair more; but if skilled mechanics are employed, the shoes will easily sell at 50 cents extra and not meet with the same competition either.

The machines constructed to make shoes are a marvel of ingenuity, and many pages would be required to fully describe them. Suffice it to say that shoes are lasted, sewed, nailed, trimmed, heeled, burnished and finished by machines constructed for that purpose.

A writer, in alluding to the changes in style, says: A change is impending in styles of shoes which, if accomplished, will deprive the street gamin to a great extent of a favorite occupation. Russet shoes are becoming fashionable. The demand has been much greater than the supply this year, and manufacturers are preparing to introduce them and push their sales for next spring and summer. Samples will be out and on the road in November. Patent leather shoes are being more used for business wear. They are commended on the score of economy. They don't require to be "shined up" every day, a matter which calls for both money and time.

Pretty woolen shoes for women, misses and children are being introduced for house wear, and a stouter make is put up for men. They are made with thin leather soles, which are covered with lamb's wool, and are warm and comfortable. For those for the women the colors and designs are lovely, and at from 65 cents to \$1 per pair they sell well.

A stylish shoe is a woman's Oxford, made with patent kid vamps, oozie quarter and calf tip, made on an opera last, with trimmings to match the colors of the quarter. The combination of colors in this shoe is, in many instances, extremely tasteful.

"The manufacture of boots for cowboys," says R. G. Haskell of Boston, "used to be quite extensively carried on. A few years ago we couldn't put too much money into them. They wanted them of the very best quality—stays, and perhaps the sun and moon, inlaid in bright-colored leather about the top, sometimes with fancy lacing up the front, and sometimes with fancy patterns on the sole by driving nails. It was not uncommon to get several dollars for a pair. The demand is changing; plainer and more unpretentious goods answer the purpose; many of these fellows wear common boots now. One distinctive characteristic of cowboy boots has been the high heels. From two to three inches was the common height. These heels are of much service when riding in keeping the feet in the stirrups, but when it comes to walking the cowboy has to take his shoes off, for pedestrianism is almost impossible with such high heels."

Among changes that are taking place in the shoe trade is that of manufacturers who have been making shoes for jobbers only, now seeking the favor of the retail trade. This process is reported to be constantly going on among the manufacturers of Lynn, for instance. It would seem, reasoning on this line, that the jobbing business is likely to find itself out in the cold after awhile. That such will not be the case, however, is made evident, if in no other way, by noticing just how such processes have gone on in other lines of trade, and the jobber is quite as important a factor as ever.

THE FIRST TO MANUFACTURE SHOES, it is said, were Saints Crispin and Crispianus, two pious Italian monks and philanthropists who lived in the third century, and since their day all followers of the shoe-making craft have been called Knights of St. Crispin. Before their day, history tells us, only sandals were worn.

THE WATCHMAKER.

American vs. Imported Clocks.

There are a good many imported clocks in this country; those imported in late years are here for no other reason in the world than because it is the fashion to buy things made abroad. The imported clock is not as good a timekeeper as the American clock. On the contrary, it is well known that this foreign-made clock will not compare with the American clock so far as telling the hour of the day is concerned. But there are a good many people in the world who do not buy clocks to keep time, it is, in a very cheap way, fashionable to possess a French or a German clock, and that is all there is of it. Fashion covers a multitude of deficiencies. These imported clocks are mounted in fancy cases, and there is quite a large class of Americans to whom the name of Paris or Berlin has a sort of undefined fascination.

It is safe to say that the American who buys an imported clock does it from some other motive than an utilitarian one.

This fancy cases in which French and German clocks have been enveloped has undoubtedly had something to do in the past with their importation. But to-day American clocks put in cases *bizarre* enough to suit the taste of the most fastidious can be found. The style of the case or the quality of the works does not cover the reason why foreign-made clocks are bought in this country. As to cost, the American clock is much the cheaper. The simple reason to-day why French clocks are popular is because they are French.

American clocks are exported in large quantities, and sold just where French and German clocks are made. The exported clocks are sold because they keep time and are cheap as to cost.

A great many things of foreign make are used in this country for the same reason that French and German clocks are used. "It is English, you know," or "It is French, or German, don't you see?" has a good deal to do with it.

NON-MAGNETIC WATCHES—Watches are now made, so protected from magnetic influence as to be absolutely free from it, even when held in the immediate vicinity of the most powerful dynamo. Ever since the great railroads of the country have compelled their employees to provide themselves with timepieces that would not be affected by the magnetism generated by the car-trucks, there has been much speculation as to whether such a watch could be made, and a sharp rivalry has been going on between the American and Swiss manufacturers. The test was highly satisfactory, and once more proved that whenever a new invention was imperatively demanded American genius could fully hold its own against the whole world. Major King's magnet was so powerful that an ordinary watch was stopped stock still as soon as it came within three feet of it. Before the test was made there was quite a diversity of opinion among the experts present as to how far it would prove successful. Those who believed that a watch might be constructed that would resist magnetic influence under ordinary circumstances, were also of the opinion that when it was subjected to this most powerful magnet in the world, the steel pinions would jar so on the working parts that the watch must necessarily stop. For ten minutes the watch was held in front of the magnet, without any effect being desirable in its movements.

A TRANSPARENT WATCH has recently been manufactured by the Waltham Watch Co. The case and plates are of Brazilian pebble, or rock crystal. Holes are drilled in this crystal plates for the various screws and fittings; the pivots are set in rubies and sapphires, and the plates are held apart by sapphire pillars. The dial is a skeleton of gold. Diamonds mark the hours and rubies the minutes. The watch is, of course, transparent.

THE HAND MADE TIME-PIECES of the Swiss and French, who have so long held the supremacy as clockmakers, are not now regarded as superior to those of American machine make. The American machine-made watch is as finished and accurate as its foreign competitor, and is, of course, vastly cheaper.

SHOP NOTES.

TRAINED MECHANICS.—It is a notable fact, and one, too, not generally known, says the *Industrial World*, that some of the "best all-around" mechanics, i. e., those who can turn their hands to all kinds of general machine work, are men who learned their business in small shops, where all sorts and all classes of work are done. An ingenious thinking man placed in such a shop has the best possible chance to develop all the talent there is in him. The hundred and one odd jobs required to be done will cause him to devise ways and means, and "to think," and in these ways he will grow to be a man fertile in resources, dexterous in touch, and ready for nearly any kind of work which may come along. Now mark the difference. A man trained in a large shop, with its score or more of departments, learns or works through, as a rule, one, two or three differ-

ent departments, of course becoming an expert in the several branches; but should occasion arise for him to do some particular work of which he has but a slight knowledge, he is out of his latitude and makes poor progress, simply because he has not done all kinds of work, while the man trained in the small shop can adapt his hand to almost anything which turns up.

FINISH WHAT YOU BEGIN—Thousands start well, but never finish one thing at a time. They have a dozen things on hand and no one completed. Time is wasted on unfinished work. Always finish what you begin. One thing finished is worth a hundred half done. The completion of an undertaking yields more pleasure and more profit than dozens of plans. The man who is always planning or scheming is rarely, if ever, successful. He often furnishes ideas for others who go persistently to work and finish what his ideas suggested. "That was my idea—my plans," we frequently hear some one say, but the man who carried it out was the one who benefited himself and others. Do not begin what you cannot finish. What you undertake to do, do, and reap the reward of your own ideas and skill. This is good advice both in and out of the shop.

WASTE OF LUBRICATING OIL—A great deal of oil is wasted through not employing a suitable filtering device. The needs of high speed machinery—and higher speeds is always the order of the day—call for the passing of more oil by and over the journals, and while the intention is to make some kind of a second use of this oil where there is any purpose for which it may be used, practically it goes mostly to waste. Oil filters are cheap and simple, and their use ought to be more common. In hundreds of cases their use would effect a very material saving, and frequently they would be the means of bringing about the use of a better quality of oil, which now seems to be too valuable to be wasted.—*American Machinist*.

A NEW BELT FASTENING of English origin is described as follows: Each end of the strap is divided into series of fingers about one-quarter or three-eighths of an inch in width, one end having an odd and the other an even number. Each division is pierced with a small hole and twisted 90°, and the two series having been placed together, a pin is put through the whole and secured by riveting its end over a washer. From the average of four experimental tests made in a large steel works establishment in Sheffield, the fastening gave a breaking strain of 644 pounds in a belt 1½ inches wide. It is said to give much satisfaction, particularly for driving fans and other machinery with small quick-running pulleys.

INGENIOUS WAY OF COOLING A JOURNAL.—Wood and Iron says that quite an ingenious way of cooling a journal that cannot be stoppied is to hang a short endless belt on the shaft next to the box and let the lower part of it run in cold water. The turning of the shaft carries the belt slowly around, bringing fresh cold water continually in contact with the heated shaft, and without spilling or spattering a drop of the water.

Meetings and Elections.

The following mining companies have elected officers for the ensuing year:

MEXICAN M. Co., Dec. 4. Directors, Chas. H. Fish (president) A. B. Hull (vice-president), A. W. Havens, Con O'Connor and Geo. Frier. Chas. E. Elliot was reappointed secretary, D. B. Lyman superintendent, and the Nevada Bank treasurer. The secretary's financial sheet shows receipts for the year of \$76,975.90, and a cash balance on hand December 1, 1888, of \$13,167.93. The superintendent's report is a brief statement of the work performed during the year.

BALTIMORE S. M. Co., Dec. 4. Directors, John H. Dickinson (president), E. M. Hall (vice-president), L. S. Rose, Chas. Hirschfeld and A. R. Grim, Trustees, Alfred R. Grim was re-elected secretary and E. Strother superintendent. The secretary's report shows an expense account of \$70,827.83 for operating the mine during the year, and a cash balance on hand of \$7310.25.

PERSONAL.—Mr. David T. Day of the U. S. Geological Survey is on a visit to this coast. Mr. Day is the Chief of the Division of Mining Statistics and Technology, and his annual report is entitled the "Mineral Resources of the United States." This volume is the most important to the mining community that the Survey publishes. It treats of all the mineral substances of the United States except gold and silver, which are in the care of the Mint Director. Mr. Day is collecting material for his forthcoming report, and familiarizing himself with the mineral regions of this coast. He will make but a short stay in California, business requiring his attention in Washington early in January.

THE TRUCKEE REPUBLICAN says: The rain has spoiled all the ice that has formed on the ponds. Should the season be propitious there will be 100,000 tons of ice cut along the Truckee this winter.

THE MOHAWK CANAL in Yuma county, Arizona, irrigating 50,000 acres of citrus and vine lands, was sold recently for \$200,000.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for the Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING NOV. 27, 1888.

- 393,693.—TAPE MEASURE—C. L. Bard, San Buenaventura, Cal.
393,686.—ORGAN—A. Birkeland, Sacramento, Cal.
393,559.—HYDRAULIC MINING APPARATUS—Hendy & Loveridge, S. F.
393,706.—STATION INDICATOR—J. I. Irving, S. F.
393,439.—DREDGER DIPPER—M. C. Laaton, Staten Island, Cal.
393,512.—SCAFFOLD BRACKET—J. A. Long, Spokane Falls, W. T.
393,440.—ROCK CRUSHER—J. B. Low, S. F.
393,479.—SELF-CLEANING WEED CUTTER—F. E. Lux, Walla Walla, W. T.
393,443.—MAKING IRON CASTINGS—G. G. Mullins, Los Angeles, Cal.
393,487.—EDGE SHAVE—A. Schillmoller, Oakland, Cal.
393,433.—SUBDIVIDING MATCH BLOCKS—Sverio & Case, S. F.
393,454.—LEAD BATH APPARATUS—A. M. Shields, North Temescal, Cal.
393,593.—BONNET HOLDER—Nancy E. Veatch, Gales Creek, Ogn.
393,456.—MECHANICAL MUSICAL INSTRUMENT—Geo. F. Wells, S. F.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business, for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

STATION INDICATOR.—JASON I. IRVING, S. F. No. 393,239. Dated Nov. 20, 1888. The invention relates to one of that class of station indicators for use in the cars of street or other railroads for the purpose of giving information as to names of streets or stations which the car is approaching, and also for advertising suitable display matter in connection therewith. It consists in a rotary shaft by which the motion is imparted or transmitted to a suitable indicating mechanism, this shaft being actuated by a spring or stop for limiting the motion of the shaft, a novel trip for relieving the shaft and rendering its motion periodical; an electric circuit normally open, and an electric magnet in said circuit for operating the trip, a circuit closer and a novel mechanism for automatically condensing the spring which actuates the main shaft.

SPRING CLASP.—HENRY ELEAU, S. F. No. 393,222. Dated Nov. 20, 1888. This is one of that class of catches or clasps in which a spring tongue enters an opposing month-piece and engages shoulders therein, said tongue being provided with a button or knob, pressure on which relieves it from its engagement. These clasps, though applicable to many devices, are to be found principally in articles of jewelry, and usually in bracelets. The invention consists, in connection with the spring tongue, of a knob or button having a threaded stem or shank seated in a fixed nut on the free end of the tongue, and constituting a set screw for locking the clasp at the same time that it serves, when not set up, as an ordinary pressure knob to relieve the tongue. The object is to provide a clasp of this character which may be securely locked, thereby avoiding accidental disengagement by unintentional pressure on the knob.

MACHINE FOR SUBDIVIDING MATCH BLOCKS.—FRANK SVERIO and JOSEPH D. CASE, S. F. No. 393,453. Dated Nov. 27, 1888. This improvement in match-making machinery consists in a table or frame having a curved top through which operate a gang of circular saws, and over which the match block passes. The table or frame has side rails and an adjustable clamp, for the match block is guided by the rails and has a handle plate for drawing it and the confined block over the top of the table and against the saws. The ordinary sulphur match is made from blocks of wood, which, after being subjected to the splitting operation in one form or another, are put through the proper treatment, whereby their split surfaces are spread to separate each splint down to the fibers or web which still holds them together at the base, so that the blocks assume a curved shape, their outer and inner surfaces being concentric, and their ends and sides in radial planes. They are then dipped in proper chemicals and left to set. These blocks contain thousands of matches, and are too large to be put on the market in that shape, so it is usual to handle each block, counting the number of matches generally, in square sets, and then by hand with a separating knife dividing these sets and forming thus small blocks, in which shape they are packed for sale. This invention has for its object the subdividing of these large blocks into the smaller ones, doing this by machinery accurately and avoiding all handling, which is very objectionable and injurious.

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For investment, it is an opportunity which rarely occurs, as Oakland is rapidly extending in this direction, and must, in the near future, include this land within its limits. This is proved by the fact that in 1860 Oakland had but 1000 people; in 1870, 10,000; in 1880, 30,000; now, 65,000 and growing more rapidly than ever.

People in the interior who desire to educate their children at the State University, in Berkeley, or at schools in Oakland or San Francisco, can establish here a rural home and be constantly with them.

This land was part of the Laundry Farm, that old and well-known Summer Resort, and is just far enough from the Picnic and Camping Grounds to be desirable and add value.

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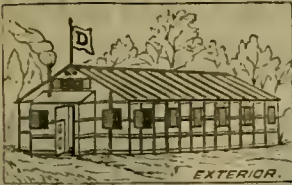
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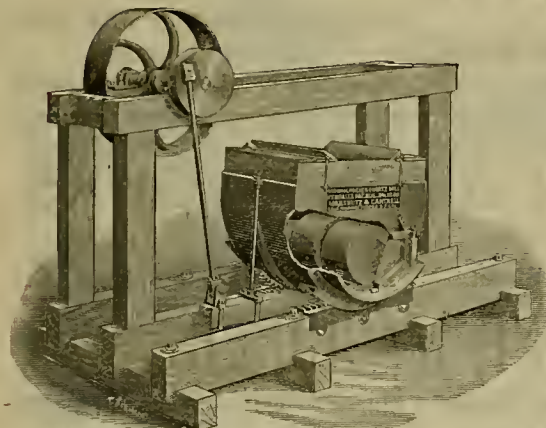
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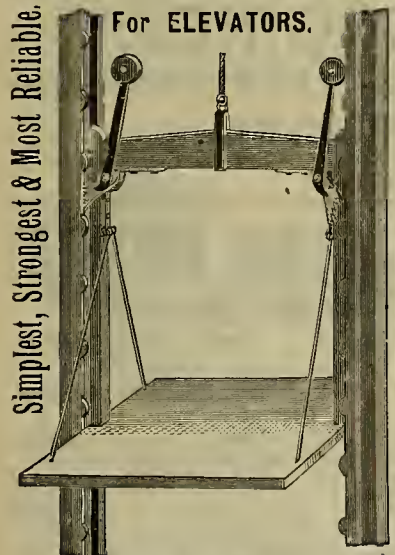
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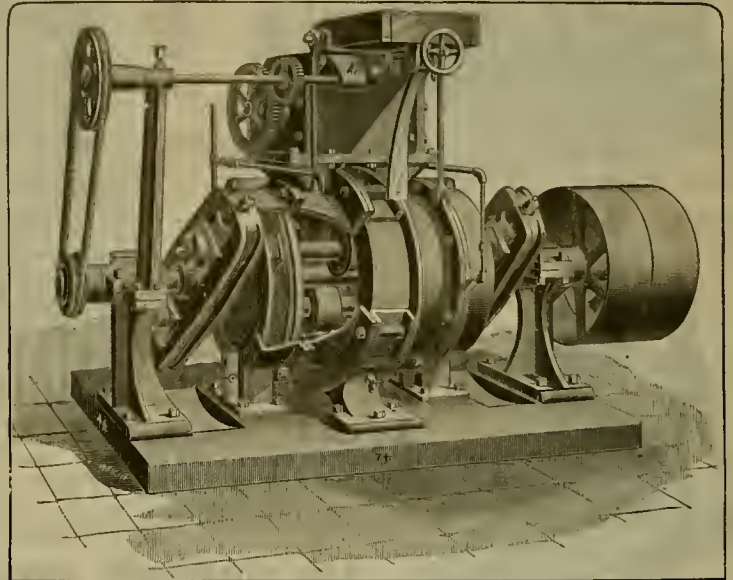
JOHN T. EVANS, M. A., Principal

COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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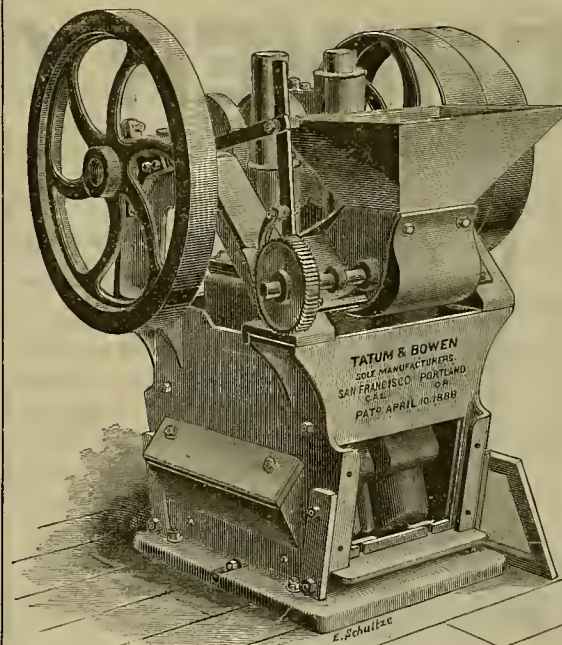
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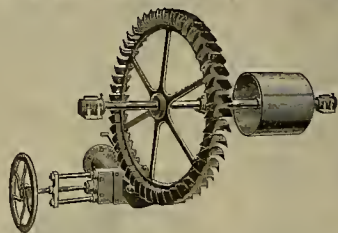
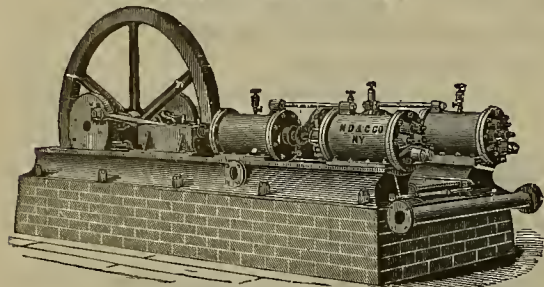
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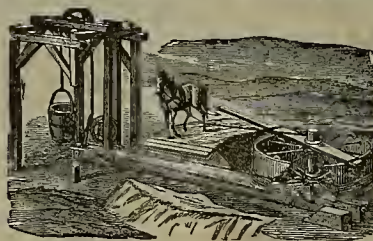
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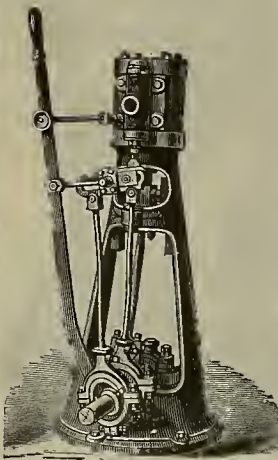
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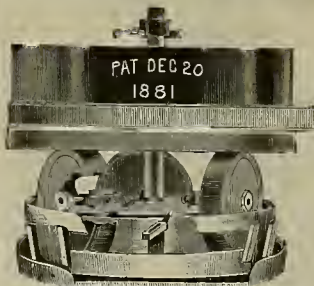
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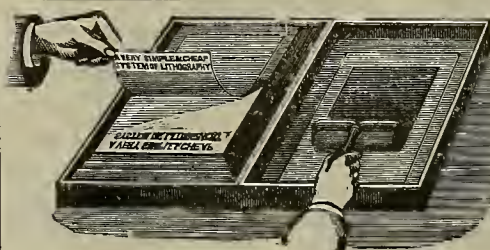
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Power applied direct. Works Ore at Low Cost. More or less weight on Crushers as desired.

Very little friction. Beats other machines in reducing and amalgamating ore, and costs less. All who have used this mill recommend it highly. Splendid for low-grade ore on account of low cost of working. The first one crushed used in Durango, Mexico, was built at my shop in Sacramento, and under my patent. Any infringement on this Patent will be prosecuted to the full extent of the law.



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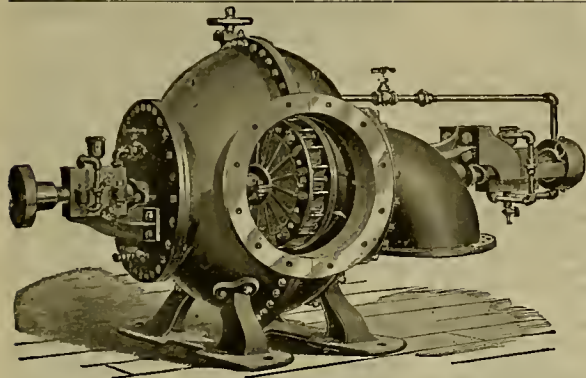
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JAMES LEFFEL'S Mining Turbine Water Wheel.

These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.

Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.

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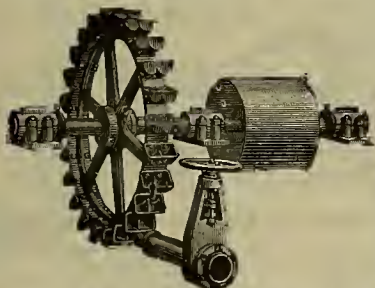
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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. And is everywhere recognized as the standard for high-pressure service.

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From 12 to 20 per cent better results guaranteed than can be produced from any other Wheel in the country. It is not only most economical of water, but the most simple and reliable power for Quartz Mills, Compressors, Hoisting, Pumping, or any other purpose where water power can be used.

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Power from these Wheels can be transmitted by electricity long distances with small loss, and made available for running Mills, Pumping and Hoisting Works, Trams, Electric Lights, etc. Address

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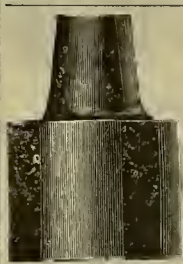
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Of the Machine-Mined Mineral in the U. S., in 1887, three-quarters of the Iron Ore and two-thirds of the Copper Ore were mined with Rand Drills.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.

WORKING TESTS OF ORES BY ALL PROCESSES.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price. Our New Illustrated Catalogue, with prices, will be sent on application.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in grains and grammes, will be sent free upon application. Agents for the Patent Plumbago Crucible Co., London, England. Also for E. G. DENNISON'S Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices.

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Nevada Metallurgical Works.

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Near First and Market Streets, S. F.

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Ores worked by any Process.

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For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass Zinc and other metals punched for all uses.

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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Dec. 6, 1888.

Although this is the closing month of the year, general trade is good. Iron workers expect 1889 to be a prosperous year, provided raw material (iron, coal and lumber) do not cost too much. Many new buildings and other improvements will be let out under contract, if the iron and wood parts are not excessively high. Merchants report continued free collections. Exchanges on New York are not so strong, which goes to show that remittances to the East are falling off in volume. Bankers look for an active money market in this month, based on the heavy sums to be paid out for taxes, interest, dividends, etc. The drafts on the banks to meet these requirements will largely reduce the surplus funds now on hand, but while doing this no friction is looked for, owing to the lateness of the season, conservative and all heretofore well-informed mining stock operators do not look for much if any of an upward movement in stocks before the turn of next year, if it comes even then. If this shall prove true, then the money requirements from stock brokers will be light, for many outside operators will sell their stocks for fear of a lower range of values before an important upward move. In grain options and for other speculative purposes the call for funds is light.

SILVER—The market the past week was firm at the decline quoted in our last issue. Some sales were made at 93½¢, but afterward 93¼¢ was obtained. The supply is still said to be light, causing buyers to pay full prices. While the news from the mining districts is of the most important character, yet the many delays in the work going on in them, due chiefly if not entirely to stock manipulation, cause many to form the opinion that the silver bullion output will not be materially increased before the turn of the year, unless the association lately organized in this city to have the many abuses which have crept into the management of the mines listed on the two exchanges compels the managers to pursue a more honest and equitable course toward the outside stockholders. From the Comstock mines there is confirmation of the new development on the 1650-foot level in Con. Virginia. It is said to be more important than before claimed. They have gone into it over 50 feet to a northwest course. The ore is said to be quite rich, but for stock purposes its importance is not admitted, which is substantially shown by the company passing the November dividend. In Alpha, Belcher, Crown Point, Con. Imperial, Challenge, Yellow Jacket and Confidence, work of an important character is going on, but then the work is being done with the view of "killing time." From the middle mines, Hale & Norcross, Chollar, etc., advances of the above tenor are also at hand. In the Tuscarora district the mines promise to increase their output of silver in this month. In the Quijotoa district important prospecting work is going on, with the outlook favorable for an increased development. The mill is not run to full capacity, so that the silver-bullion output will not average much over \$15,000 a month—enough to meet all expenses in the mine that is being chiefly explored. In the Calico district in this State the mines are being well prospected, with the outlook favorable for a large output of silver bullion.

London cables came through to-day reporting silver 42.9-16d. This decline was indicated yesterday by the low prices. Indian Consol bills were allotted. New York came through at 92½¢. In our market buyers bid 92½¢ to-day. There was quite a panicky feeling in stocks to-day. At the declining prices insiders are reported to be buying.

QUICKSILVER—An improved home demand for the mining districts is reported, as the recent rains have allowed the starting up of quite a large number of mills. For export there is a fair movement. The latest quoted sale is \$42.50.

LEAD—The market is featureless. Values appear to be slowly giving way. No important movement is looked for until after the turn of the year.

COPPER—The market has a firmer, more confident tone, due to gradual absorption by the syndicate of the output of the more promising mines and also to the fire in the Calumet and Hecla mines. The trade call is slow.

TIN—The market for both pig and tin plate has a weaker tone in sympathy with the slight decline abroad. Buyers of round parcels to arrive are trying to obtain further concessions. The consumption in 1889 will be larger than ever before.

IRON—The market is dull and inactive for both spot and to arrive. Iron workers do not appear disposed to anticipate their wants to any great extent unless offered inducements, but importers say that the supply markets are very strong, which combined with higher freights precludes a lower range.

CHROME IRON ORE—Kruse & Euler, who handle supplies on this coast, report steady shipments to the East.

COAL—For spot an advance of \$1 per ton has been established on Australian. For domestic, prices are unchanged. Under the stimulus of high prices the output of coal costs is not only largely increased, but constantly enlarging in volume. Arrivals of coal at this port in November were 140,600 tons, against 121,600 in November, 1887. For the first 11 months of 1888 they were 1,272,800 tons, against 966,800 for the same time in 1887 and 875,950 in 1886. This year's arrivals are the largest ever known.

COKE—The market is bare of English, even \$20 per ton failing to draw out supplies. Two vessels are leaving England for this port having coke on; it is held at \$15 to arrive.

Eastern Metal Markets.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":
Prices generally ruling for metals not regularly

dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Biliton Tin, \$24.50@—; Banca Tin, \$24.25@24.50; Baltimore Copper, \$—@—; Orford Copper, \$16.00@16.25; P. S. C. Copper, @—; Foreign Lead, \$4.75@5.00; Foreign Spelter, \$6.00@6.25; Antimony, \$10.00@13.50.

TIN—Trading has reached a total of 110 tons, or within 20 tons of last week's figures; but the aspect of the market has been less spirited.

COPPER—With another perfectly blank record of sales, has yet been more irregular, tending on the whole to increased firmness. The relative position of the several options has been twice reversed, the earlier deliveries having been most preferred; but at the close these weakened.

LEAD—Less interest has been taken in the metal, and recorded sales have fallen off to 116 tons.

SPELTER—Became heavy early in the week, losing an eighth of a cent; but has partially recovered toward the end, at the same time receiving more attention.

PIG IRON—Prices are remarkably steady considering the apathy of buyers. Large buyers are not in the market to any extent as yet, and are evidently waiting for sellers to make their first move. Meantime only small lots are taken at quoted rates.

MANUFACTURED IRON—The mills are all fairly well supplied with orders for the balance of the year, but offerings at low prices by Western concerns unsettle the market. There is a disposition to make moderate concessions to desirable parties, but no quotable changes can be made as yet, as a large proportion of the demand is for small lots.

By Telegraph.

NEW YORK, Dec. 6, 1888.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday	42½	93½	17 45	3 70	22 15
Friday	42½	93½	17 45	3 70	22 30
Saturday	42½	93½	17 35	3 75	22 20
Monday	42½	93½	17 40	3 70	22 00
Tuesday	42½	93½	17 40	3 70	22 00
Wednesday	42½	93½	17 40	3 72½	21 85

The market closed as follows: Borax is steady at last week's figures. Quicksilver is something firmer. There were light sales at 59¢/c. Last week's copper prices are not immediately affected by the Calumet and Hecla fire. No speculative impulse was aroused and few spot orders appeared. Calumet and Hecla stock declined about 50 points on the news and closed at \$2.70. Offerings of pig lead are light. General business was dull. Refined petroleum—Barrels—\$7.20; plain cases, \$9.20.

San Francisco Metal Market.

WHOLESALE. THURSDAY, Dec. 6, 1888.

ANTIMONY—French Star	134½	14
BORAX—Refined	73½	74
Ingot	73½	74
Powdered	73½	74
Concentrated	73½	74
COPPER—		
Bulk	26½	27
Sheeting	26½	27
Ingot	16 90	19 90
Fire Box Sheets	—	26
IRON—Glenora ton	—	—
Eglington ton	—	—
American Soft, No. 1, ton	—	32 50
Oregon Pig ton	—	30 00
Clay Lane White	—	24 50
Bar Iron (base price) #10	23½	24
Chrome Iron ore, #1 ton	8 00	10 00
LEAD—Pig	5 40	5 41
Sheet	5 40	5 41
Pipe	7 00	7 00
Shot, discount 10% on 500 bags	1 55	—
Buck, #10	1 75	—
Shot, #10	1 95	—
STEEL—English B.	16 00	20
Canton tool	91	—
Black Diamond tool	10 10	16
Pick and Hammer	8 00	10
Machinery	—	—
Toe Calk	41	—
TINPLATE—Coke	5 00	5 15
Charcoal, 14x20	6 75	7 25
do roofing, 14x20	5 50	5 62½
Fig. 10, 10 lb.	24½	25
QUICKSILVER—By the flask	—	24 50
Flask, new	1 05	—
Flask, old	85	—
COKE—English, ton	20 00	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.	Per Ton.
Australian	\$10 10	\$11 00 Cardiff
Liverpool	\$11 00	\$11 50 Lehigh Lump
West Hartley	\$11 00	\$12 50 Cumberland bk
Scotch Splint	\$11 00	\$12 00 Egg, hard

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

IRVING PATENT FUEL CO., Dec. 3. Capital stock, \$500,000. Directors, A. G. Mayer, Joseph Pracy, J. I. Irving, James Hamilton and A. T. Nation.

BUTCHERS' GAZETTE PUBLISHING CO., Dec. 3. Capital stock, \$25,000. Directors, J. Mignolia, H. W. Plumme, A. D. Bell, J. E. Sliukey and E. Heymans.

BLAZING STAR M. CO., Dec. 5. Location, California. Capital stock, \$250,000. Directors, O. J. Moore, E. P. D. Inforth, Mary E. Moore, W. A. Keefer and S. B. Paige.

CALIFORNIA CANNED GOODS ASSOCIATION, Dec. 5. Object, to promote the canned goods interest of the Pacific Coast. Directors, Isidor Jacobs, Philip D. Code, Wm. H. Wright, Wm. S. Stevens, John T. Cutting, Wm. L. Locke and John Kleinhaus. The corporation has no capital stock and the members of the association are: A. Lusk & Co., J. M. Dawson Packing Co., J. K. Armsby Co., Johnson-Locke Manufacturing Co., Golden Gate Packing Co., Gilroy Fruit-Packing Co., San Jose Packing Co., Magnolia Fruit Cannery, M. J. Fontana & Co., Scotholder & Gibbs, Chas. W. Pike, Snter Oauing and Packing Co., and Carquinez Packing Co., John T. Cutting & Co.

THE impurity of the water supply at San Luis is complained of.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	NO. AMT.	LEVIED.	DELINQ.	NT. SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.	Nevada	21.	87½	Nov 3.	Dec 8.	Dec 23.	C. E. Elliott.
Alpha Con M & M Co.	Nevada	2.	25.	Nov 3.	Dec 8.	Dec 23.	E. E. Elliott.
Best & Belcher M Co.	Nevada	41.	25.	Oct 16.	Nov 21.	Dec 11.	L. Osborn.
Benton Con M Co.	Nevada	18.	1.00.	Oct 29.	Dec 3.	Dec 24.	V. B. Allen.
Con Imperial M Co.	Nevada	25.	05.	Oct 16.	Nov 21.	Dec 12.	C. L. Mc Coy.
Caledonia M Co.	Nevada	43.	15.	Oct 19.	Nov 21.	Dec 12.	A. S. Groth.
Commonwealth Con M Co.	Nevada	7.	50.	Nov 24.	Dec 28.	Jan 21.	H. Deas.
Del Monte M Co.	Nevada	4.	25.	Oct 15.	Nov 20.	Dec 12.	J. W. Pew.
Found Treasure M Co.	Nevada	4.	06.	Oct 25.	Nov 30.	Dec 21.	J. R. Bradford.
Western Quicksilver M Co.	Calif.	3.	15.	Nov 23.	Jan 7.	Jan 28.	A. Halsy.
Gover M Co.	California	1.	15.	Nov 23.	Jan 7.	Jan 28.	A. Halsy.
Gray Eagle M Co.	Nevada	10.	05.	Nov 13.	Dec 18.	Jan 8.	O. H. Bogart.
Hornshaw Bar Con M Co.	California	1.	25.	Oct 9.	Nov 17.	Dec 10.	D. M. Keut.
Kosuth M Co.	Nevada	10.	10.	Nov 21.	Dec 24.	Jan 19.	R. P. Flint.
Kayes F M Co.	Nevada	3.	25.	Oct 22.	Nov 24.	Dec 15.	M. P. Mint.
Lord of Lorn M Co.	Nevada	4.	10.	Nov 13.	Dec 23.	Jan 22.	L. G. Harvey.
Live Oak Drift Gravel Co.	California	10.	05.	Nov 19.	Dec 21.	Jan 16.	J. Morizio.
Mayflower Gravel M Co.	California	43.	50.	Oct 16.	Nov 16.	Dec 10.	J. Morizio.
Montrose M Co.	Colorado	1.	14.	Oct 3.	Dec 24.	Jan 23.	F. E. Luty.
North Belle Isle M Co.	Nevada	3.	15.	Oct 22.	Nov 24.	Dec 15.	M. P. Mint.
North Commonwealth M Co.	Nevada	1.	30.	Oct 15.	Nov 19.	Dec 11.	J. W. Pew.
Puget Sound Iron Co.	Wash Ter.	12.	1.10.	Oct 23.	Nov 29.	Dec 21.	A. Halsey.
Ra-sell Reduction & M Co.	California	3.	10.	Oct 18.	Nov 26.	Dec 17.	J. Morizio.
Sage Nevada M Co.	Nevada	3.	25.	Oct 13.	Jan 2.	Jan 28.	E. L. Parker.
Seg Belcher & Mides Con M Co.	Nev.	2.	25.	Dec 3.	Jan 7.	Jan 28.	E. B. Holmes.
Wm Penn M & M Co.	Nevada	3.	10.	Nov 8.	Dec 17.	Dec 31.	J. S. Seville.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Andes M Co.	Nevada	B. Burns.	309 Montgomery St.	Annual.	Dec 18
Amador M Co.	California	F. E. Luty.	309 Montgomery St.	Annual.	Dec 17
Gould & Curry M Co.	Nevada	A. K. Durbrow.	309 Montgomery St.	Annual.	Dec 17
Head Center & Tranquility M Co.	Arizona	J. W. Pew.	310 Pine St.	Annual.	Dec 11
Locomotive M Co.	Arizona	A. H. Fish.	309 Montgomery St.	Annual.	Dec 17
Mt Diablo M & M Co.	Nevada	R. W. Heath.	310 Pine St.	Annual.	Dec 17
Mayflower Gravel M Co.	California	J. Morizio.	328 Montgomery St.	Annual.	Dec 17
Ophir M Co.	Nevada	E. B. Holmes.	309 Montgomery St.	Annual.	Dec 19
Ontario M Co.	Utah	I. C. Stump.	309 Montgomery St.	Annual.	Dec 15
Peck M Co.	California	C. T. Bridge.	224 California St.	Annual.	Dec 21

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Con California & Va M Co.	Nevada	A. H. Havens.	309 Montgomery St.	1.00	Oct 11
Confidence M Co.	Nevada	A. S. Groth.	328 Montgomery St.	50	Aug 6
Caledonia M Co.	Nevada	C. E. Gremm.	328 Montgomery St.	68	Nov 26
Caledonia Con M Co.	Nevada	C. T. Gremm.	328 Montgomery St.	25	Nov 26
Eureka Con M Co.	Nevada	H. R. P. Hutton.	306 Pine St.	25	July 9
Mt Diablo M & M Co.	Nevada	R. W. Heath.	310 Pine St.	25	Aug 27
North Star M Co.	California	D. A. Jennings.	401 California St.	50	Nov 11
Hale & Norcross M Co.	California	J. F. Lightner.	309 Montgomery St.	50	Aug 8
Idaho M Co.	California	J. F. Lightner.	309 Montgomery St.	50	Aug 8
Pacific Borax, Salt & Soda Co.	California	A. H. Clough.	230 Montgomery St.	1.00	Dec 10

Mining Share Market.

The Comstock lode is looking very well at present, and many persons think a lucky strike anywhere along the line would send stocks up at a hoisting rate. More interest is being paid to work on the lode than for some time past.

At the Consolidated California and Virginia office it is estimated that the gross yield of the mine for the fiscal month now drawing to a close will be between \$220,000 and \$225,000, which, together with the surplus previously on hand, will give a sum that will fall short between \$7000 and \$10,000 of the amount required to pay the monthly expenses and a dividend. The company will carry over about \$100,000 in coin into the next month.

The following companies have cash on hand according to the monthly financial statements placed on file:

Alpha, \$1848 64; Alta, \$43,108 23; Andes, \$19,887 54; B. lcher, \$14,933 41; Best and Belcher, \$16 606 49; Bodie, \$34,396 48; Bullion, \$14,234 49; Bulwer, \$7694 99; Benton, \$3318 42; Caledonia, \$13 746 49, and the balance of an assessment to collect amounting to \$1535 10; Chollar, \$2918 89; Con. Cal. and Virginia, \$56,507 09, and \$165 508 72 in unpaid bullion. Confidence, \$75,653 80; Con. Imperial, \$21,618 47; Crocker, \$4843 66; Crown Point, \$8423 88; D. I. Monte, \$142 66; Exchange, \$16,436 25; Found Treasure, \$769 79; Gould and Curry, \$11,837 08; Hale and Norcross, \$893 30; Independence, \$3080 16; Julia, \$1059 28; Lidy Washington, \$24 828 18; Locomotive, \$3297 62; Mexican, \$13,167 93; Monna, \$21 642 14; Navajo, \$2,003 47; Pondera, \$99 27; Ophir, \$30,488 46; Overman, \$13,028 69; Scorpion, \$2247; Standard, \$4191 45; Syndicate, \$9273 43; Utah, \$17,526 54; Union, \$2445 88; Welden, \$2623 40.

The following companies have an indebtedness: Belle Isle, \$156 23; Challenge, \$4832 24; Commonwealth, \$49 154 18; Grand Prize, \$31,540 29; Holmes, \$1382 80; Nevada Queen, \$35,928 80; North Belle Isle, \$16,083 02; North Commonwealth, \$1749 88; Peer, \$5550 45; Peerless, \$4769 48, but has an offset of bullion valued at \$7791 63; Potosi, \$1273 40; Occidental, \$2972 88; Savage, \$35,373 74; Seg. B. lcher, \$26,681 19; Sierra Nevada, \$5535 20.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive further reports:

Peerless, Nov. 29, \$7791; Mt. Diablo, 29, \$7154; Germania, 28, \$4790; Hanauer, 28, \$2800; Queen of the Hills, 28, \$1100; Hanauer, 29, \$7500; Queen of the Hills, 29, \$8500; Hanauer, 30, \$2075; Germania, 30, \$3019; Con. Cal. and Virginia, Dec. 1, \$24,964; Confidence, Dec. 4, \$16,672; total for November, \$82,729; Savage, Dec. 6, \$8377; Mt. Diablo, \$6, 8536.

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W. W. THORALD—San Diego Co.
JOHN L. DOYLE—Sonoma Co.

THE Plomo group of mines, Tyudal district, Pima Co., Arizona, has been sold to New York parties. Reduction works are to be erected.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Nov. 15.	WEEK ENDING Nov. 22.	WEEK ENDING Nov. 29.	WEEK ENDING Dec. 6.
Alpha	3.40	3.70	3.15	3.90
Alta	3.55	4.03	3.10	3.80
Andes	1.00	1.70	1.50	1.61
Argenta	1.00	1.10	1.10	1.15
Belcher	7½	88	75	66
Best & Belcher	7½	107	90	93
Bullion	1.85	2.00	1.50	1.75
Baltimore	70	75	65	70
Bodie	40	45	40	50
Bodie Tunnel	2.10	2.40	2.10	2.40
Benton	1.60	1.75	2.45	2.90
Bulwer	70	80	65	60
Cal. & Cal.	10	11	10	12
Challenge	8.00	9.70	65	68
Champion	3.70	5.00	3.90	4.50
Chollar	1.75	2.30	1.60	1.75
Confidence	1.00	1.25	1.10	1.25
Con. Imperial	55	60	45	53
Con. Pacific	7½	8.50	6.25	7.00
Crown Point	1.00	1.10	1.00	1.10
Crocker	45	50	40	50
Dudley	1.00	1.10	1.00	1.10
East B. & B.	3.50	4.00	3.00	3.50
Eureka Con	1.65	1.85	1.75	1.45
Exchange	1.65	1.85	1.75	1.45
Grand Prize	5.00	6.00	4.50	5.00
Gould & Curry	5.00	6.00	4.50	5.00
Hale & Norcross	6.25	7.50	6.50	6.80
Holmes	65	70	60	65
Independence	65	70	60	65
Ionia	30	35	30	35
Justice	2.30	2.65	2.50	2.80
Kentuck	3.85	4.00	3.85	4.00
Lady Wash	70	80	65	70
Main White	1.60	1.70	1.50	1.60
Mexican	4.95	5.5	4.75	5.25
N. Diabolo	2.50	2.60	2.50	2.60
Northern Belle	2.50	2.60	2.50	2.60
Navejo	2.50	2.60	2.50	2.60
North Star	2.50	2.60	2.50	2.60
Niagara	2.50	2.60	2.50	2.60
Nev. Queen	2.50	2.60	2.50	2.60
North G. & C	2.40	2.70	2.30	2.60
North Central	73	87	70	80
Ophir	73	87	70	80
Overman	2.25	2.40	2.25	2.40
Potosi	3.90	4.7	3.60	4.5
Peerless	1.30	2.05	1.60	1.70
P. Shoshone	70	71	60	65
P. Shoshone	70	71	60	65
Silver Star	5.25	5.5	4.40	5.00
Savage	5.25	5.5	4.40	5.00
S. B. & M.	4.00	4.35	3.55	3.90
Star & Nevada	4.00	4.35	3.55	3.90
Silver Hill	80	85	70	75
Silver King	1.40	1.4	1.40	1.40
Scorpion	70	80	65	65
Syndicate	1.40	1.4	1.40	1.40
Utah	1.75	1.95	1.50	1.70
Utah	1.75	1.95	1.50	1.70
Yellow Jacket	6.50	73	6.50	6.50

Assessment Notices.

William Penn Mill and Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Devil's Gate Mining District, Lyon county, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 5th day of November, 1888, an Assessment (No. 3) of 10 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 59, Nevada Block, No. 300 Montgomery street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 15th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 31st day of December, 1888, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

J. J. SCOVILLE, Secretary.

OFFICE—Room 59, No. 300 Montgomery street, San Francisco, California.

Lord of Lorn Gold and Silver Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Gold Hill Mining District, Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 13th day of November, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 28th day of December, 1888, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Tuesday, the 22nd day of January, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.

OFFICE—313 California St., San Francisco, Cal.

Gover Mining Company—Location of

principal place of business, San Francisco, California. Location of works, near Drytown, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors held on the 23rd day of November, 1888, an Assessment (No. 1) of Fifteen (15) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 5th day of January, 1889, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on Tuesday, the 22nd day of January, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

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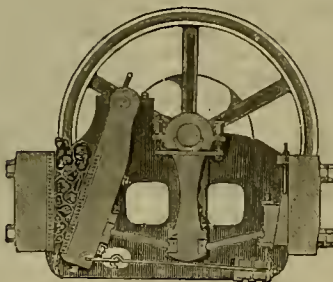
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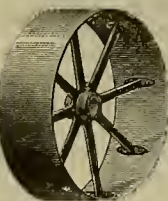
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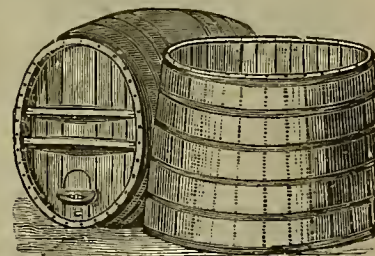
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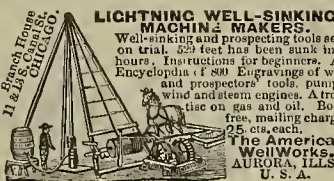
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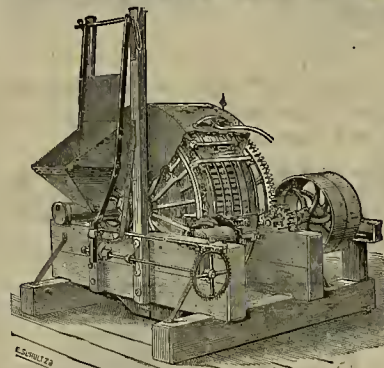
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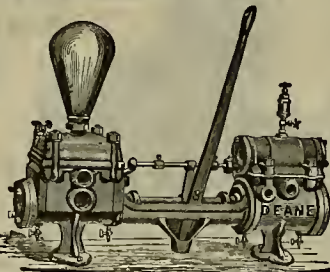
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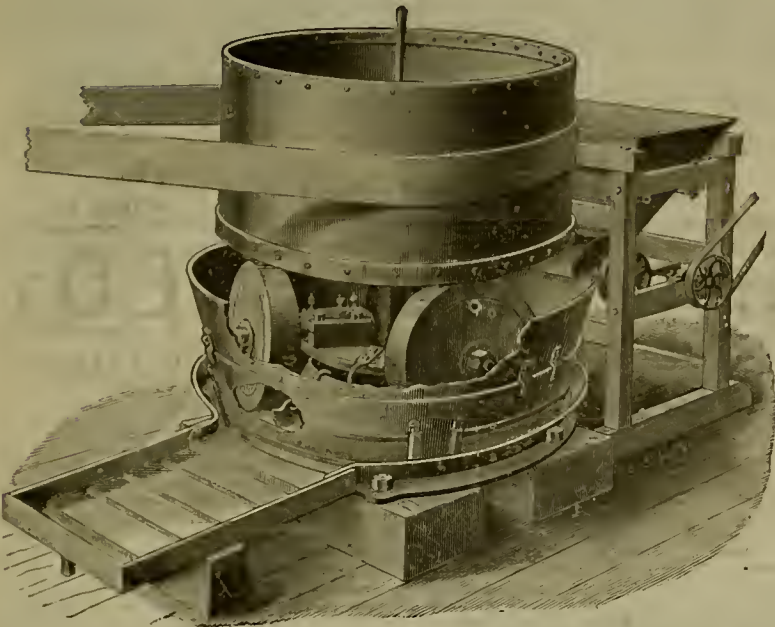
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The most perfect Roller Mill made, for the following reasons:

1. It is cheaper.

2. It is more durable.

3. It crushes a larger amount of ore with less power.

4. It amalgamates a larger percentage of the gold.

5. Its "clean-up" is quicker and fuller.

6. It is portable, requires no frame-work, and is ready for the foundation as it leaves the shop.

OFFICE OF THE CADELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

Bryan's Roller Quartz Mills, one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard; we crush through a No. 60-mesh screen. Our mills run 55 revolutions per minute, and each crush through 60-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set of Tyres will crush 1500 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "poon" earning one dollar per day has complete charge. In regard to slimes, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scraper, a much less amount of slimes is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismantled in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequalled by any mill now in existence.

Yours truly,
D. M. WURNS, Superintendent

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THE GREATEST ROCK CRUSHER ON EARTH!

WHAT IS SAID OF IT BY ONE WHO HAS USED IT THREE YEARS.

OFFICE OF ERNEST L. RANSOME, MANUFACTURER OF ARTIFICIAL STONE AND CONCRETE,
No. 508 CALIFORNIA STREET, SAN FRANCISCO, November 9, 1888.

Pacific Iron Works—GENTLEMEN: In answer to your request for my experience with the Gates Crusher would say, that I have used one for the past three years crushing trap rock, basalt and granite for making concrete, the most of it being very hard and calculated to test severely the strength and durability of any machine.

I have crushed in that time probably not less than 10,000 tons of this material, without any repair being necessary, and without any change of shoes and dies, and, as far as I can judge, they appear to be good for as much more service.

I have had more or less experience with nearly every crusher in the market, and regard the Gates as infinitely superior to them all. In fact its efficiency, durability and capacity for work is simply wonderful. For crushing all kinds of ore, ballast or macadam—fine or coarse—nothing can compare with it. You are at liberty to refer any parties to me who may want further evidence as to the merits of this remarkable machine. Very truly yours,

SEND FOR CIRCULAR.

ERNEST L. RANSOME.

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Centrifugal Roller Quartz Mill.

ORE CRUSHER

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IN QUARTZ, GRAVEL AND PLACER MINING.

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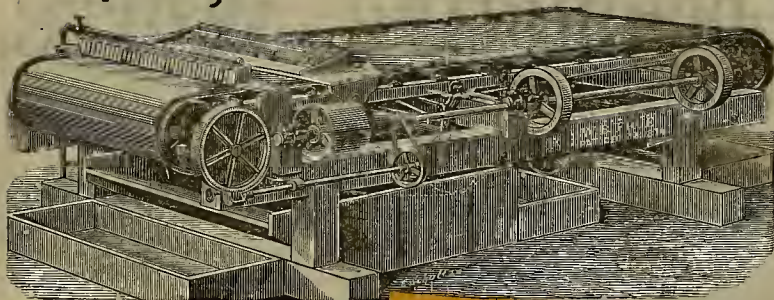
Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts.

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\$1,000 CHALLENGE!



PRICE: FIVE HUNDRED AND SEVENTY-FIVE DOLLARS (\$575.00) F. O. B.

OVER 1400 ARE NOW IN USE. Concentrations are clean from the first working. The wear and tear are merely nominal. A machine can be seen in working order and ready to make tests at 220 Fremont Street, San Francisco.

THE MONTANA COMPANY (Limited), LONDON, October 5, 1885.

DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered twenty more of your machines for immediate delivery. Yours truly,

THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

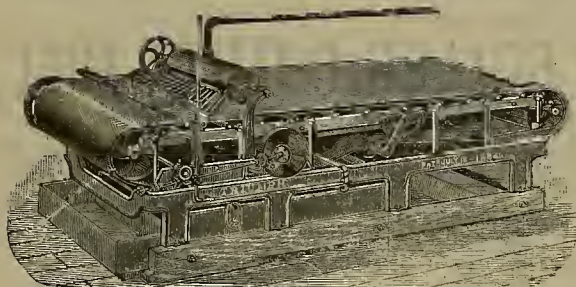
Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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OR VANNING MACHINE

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\$1,000 CHALLENGE ACCEPTED,

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THE "TRIUMPH" ORE CONCENTRATOR.

The present improved form of the celebrated "TRIUMPH" Ore Concentrator possesses many advantages over any other style of Vanners, Vanning Machines, or Concentrators, yet introduced to the notice of mining men. These advantages consist in the superior features which enter into their construction, and facilitate their operation.

They are constructed in the best manner; their frames being of iron, insures their solidity, durability, and perfect steadiness of motion when operated. They are built as compactly as their requisite strength will permit, weigh less, require less freight space in boxes, by which their cost of transportation is reduced, and occupy less mill room when set up.

An important improvement has recently been introduced into their construction, which consists of a RIFFLE TABLE placed in front of and which takes the discharge from the feed and amalgam bowl. The improvement is in the reciprocal motion which is imparted to this table by the longitudinal motion of the shaking frame to which the table is attached. We have at hand many testimonials, from well-known Superintendents of mines in different mining districts of the United States, bearing evidence of the efficiency and superiority of this form of Concentrator, and we shall be pleased to send Circulars covering such letters of testimony, and, as well, directions for setting up and operating these machines, and are ready to quote special prices for any considerable order.

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Nos. 39 to 51 Fremont St.,

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LEATHER and RUBBER

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LUBRICATING COMPOUNDS and OILS

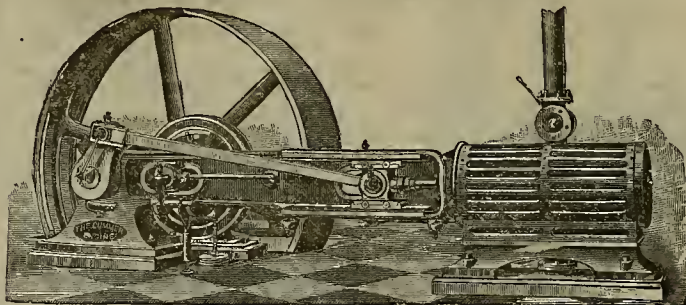
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PIPE and PIPE FITTINGS.

Brass Goods

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FITTINGS.

Hydraulic Mining, Quartz, and Saw-Mill Machinery, Hydraulic Gravel Elevators, Hydraulic Giants, "Triumph" Ore Concentrators, Automatic Ore Feeders.



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(Manufactured by the Cummer Engine Co., of Cleveland, Ohio.)

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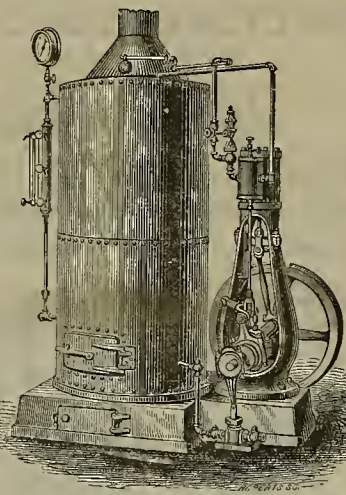
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Pulleys,

Boxes,

Hangers.



Upright Engines and Boilers Connected.

WOODWORKING MACHINERY,

—COMPRISING—

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Single and Double Circular Saw-Mills.

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"Baker" Rotary Pressure Blowers.

"Wilbraham" Rotary Platen Pumps

Bogge & Clarke" Centrifugal Pumps.

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Buffalo Duplex Steam Pumps.

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THE RUSSELL PROCESS COMP'Y.

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THE BUFFALO CONSOLIDATED GOLD
Mining Company, Sierra City, Cal. Ernest Busch, Superintendent. Stock divided into 600,000 shares at \$1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge. Tunnel No. 1, 23 ft.; No. 2, 9 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 10 stamp mill run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Busch, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Busch, Supt., or Hugh Murray, Sec'y.

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THE CALIFORNIA CONSOLIDATED
Gold Mining Company, Sierra City, Cal. A. Schubert, President; Alvin Fischer, Secretary; A. Laffer, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two locations. Ore assays 87 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 15, 1888.

VOLUME LVI.
Number 24.

A Tereido-Proof Pile Covering.

The accompanying engraving represents how wharf-piles are protected from the ravages of the tereido, limnoria and other marine insects by the Anderson & Elias tereido-proof pile covering, after they are driven and placed on a wharf. The piles are always attacked between high and low water, or down to the mud. The piles are prepared and covered before they are driven with a steel, iron or galvanized iron jacket which is tightly fitted.

The pile is first stripped of its bark and properly smoothed down to a straight line. After that it is covered with hot coal tar mixed with asphaltum. The jacket is then riveted firmly in place around the pile so that underneath it is perfectly water-tight. The jacket has flanges with holes to receive rivets every three inches.

The greatest trouble in driving piles prepared by ordinary methods has been in driving them without injuring or loosening the covering, or preparation. Coverings nailed or cemented on are shaken loose by the heavy jar caused by the blows in driving. In this instance no nails or spikes are used to secure the covering, only one single bolt through the top of the jacket passing through the pile. Driving the pile will not loosen the jacket; neither will the motion of ships alongside the wharves in stormy weather, as the spring of the pile will be between the jacket and the mud.

The metallic jackets and flanges add strength to the piles, and it is claimed that 800 piles prepared in this manner will make as equally strong a wharf as 1000 ordinary ones by being put further apart. The difference will about cover the cost of preparing them. The company is of the opinion that an eight-inch steel-jacketed pile will be as strong for service as the bare 12-inch pile.

Numerous inventions to ward off the attacks of limnoria and tereido have been made. The destruction caused by this worm and insect in the different harbors of this country is estimated at about \$3,000,000 every year, and piles in many places only last from two to five years. The metal-jacketed piles can be prepared and shipped to any part of the world without injury to the covering which protects them.

This company claims that the reason so many others have failed to preserve piles is that the majority have tried to poison the wood by injecting different liquids into it; but the tereido does not live on the substance of the wood, but merely bores a hole for a habitation and enlarges it according to its growth. Even with arsenic in the wood, the tereido bores as long as he has salt water from which to draw nourishment. Creosote, they claim, is also ineffective for the same reasons, though very costly experiments have been made with it.

When copper or other metal is nailed to piles, the jar of the pile-driving hammer loosens the fastenings and holes are left for the tereido to enter when any of the nails drop out. In this way they get access to the wood. By riveting the jacket around the pile there is no chance for any hole to be made in the wood. "The limnoria or grebble attacks the piles in shallower water than the tereido, and more so around a rocky bottom. The theory of these inventors as to the habits of the insect is this: They are much like a shrimp in form, but only about one-sixteenth of an inch in length. They have many legs, and the two hind ones are quite long, so that they spring or

jump like a grasshopper. They attack a pile or piece of wood which is stationary and will destroy it in a few months by steadily jumping on to it. It has never been discovered whether they live off the wood or merely stay there for a place of habitation. No wood is too hard for them to penetrate. They only attack a few feet of the pile, but finally cut it off trans-

Pacific Coast Steel and Shipbuilding.

Some of the Eastern shipbuilders seem to be rather jealous of the success made by the Pacific Rolling-Mills of this city in the matter of manufacture of steel castings for the new cruisers. An interview with Mr. Cramp, the builder of the Baltimore, represents him as

the Union Iron Works were based upon their making the steel castings. That they did make them is in evidence by the fact that the Charleston was launched July 19, 1888, the Baltimore October 6, 1888. The Pacific Slope does not like to follow in anybody's wake. The statement that the rolling-mills had to send East to Chester for a foreman who had been trained in the Standard Co.'s works before they could make a success of the casting, is also incorrect. The man referred to only came in August as foreman molder, not steel-maker, and the Charleston's castings were made before he arrived.

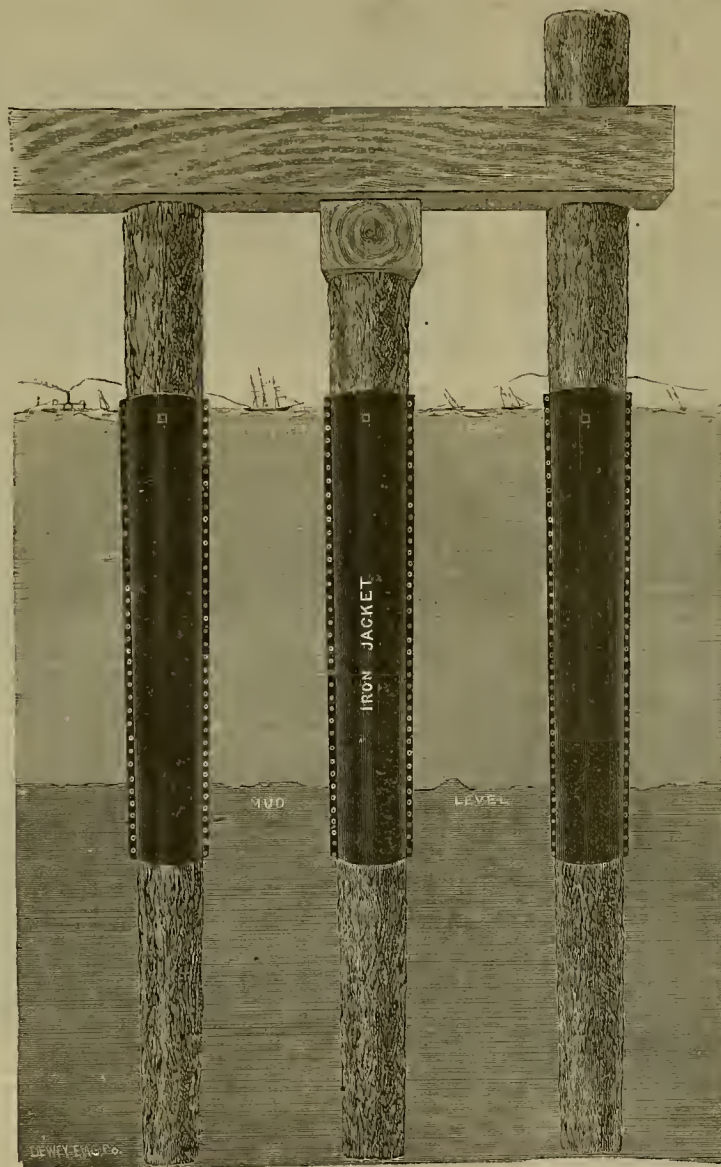
As before stated in the PRESS, the steel made here at the Pacific Rolling Mills for the Union Iron Works to put into the cruiser Charleston is of exceptionally fine character. It has been highly commended by the Government inspectors, and also officially by the Secretary of the Navy, and has given satisfaction to all except rival builders.

As Mr. Scott says, our Pacific Coast weather and good steel castings help shipbuilding amazingly. This industry is only in its infancy among us. The enterprise of the Union Iron Works in building such an establishment as they have and so successfully accomplishing any work intrusted to them, has proven not only to ourselves, but to the people of the country, that the shipbuilding industry will flourish here. Our timber resources are unsurpassed for building ordinary vessels, and now that the big shipyard on the Potrero is in running order, we have proven that iron and steel vessels can be as profitably constructed.

THOMAS PRESTON, superintendent of the Sierra Buttes gold mine, Sierra City, died in this city on Monday last after a brief illness. Mr. Preston was a native of Manchester, England, and was 43 years of age. He entered the service of the Sierra Buttes Company in a subordinate capacity about 1872, and has continued with them since, for a number of years past, as superintendent. The company employs several hundred men, and the works are the most complete in Sierra county. The mine is the deepest worked gold mine in the world, a tunnel now approaching 9000 feet in length tapping the vein at a depth of 3000 feet, from where it was worked at the drop-pings. Mr. Preston has managed the mine not only to the satisfaction of the company, but of the employees. The writer of this paragraph passed several weeks with him at the mine not very long since and can cordially testify to the reputation Mr. Preston had achieved as a hospitable and genial gentleman. He was well known and liked throughout the region where he lived, and was recognized as an upright, honest and capable man.

MR. LOUIS BLANDING has shown the editor of the Sonoma Banner a contrivance to be attached to mining cars used on inclines. It is placed on the front end of the car and is so arranged that if the rope should break a clasp falls and catches an iron plate fastened to the ties. By such an arrangement it would be impossible for a car to rush down when a rope gives way.

THE new steamer Yaquina Bay, in making her first trip from San Francisco, went ashore at Yaquina bay. It was at first thought she would be a total loss, but it is now hoped she may be saved.



IRON-JACKETED PILES FOR WHARVES.

versely." The inventors of this covering are confident that they have solved the problem of preserving piles. They have formed a company for building wharves and piers under this patent. The directors are: Senator A. J. Meany of Merced; Hon. James A. Orr, Hon. John Gamble, James M. McCarty, M. McCarty and Ben F. Kohlberg of Stockton, and L. H. Anderson of San Francisco. The president is A. J. Meany, secretary L. H. Anderson, and treasurer J. M. McCarty. The general manager is Henry Anderson of this city. A pile 65 feet long, prepared in the manner described, is on exhibition in this city at the corner of Lombard and Battery streets, near the seawall.

rather disparaging the steel made here for the Charleston, and claiming that "only one of the great manufacturers of steel in the United States—the Standard Steel-Casting Co. of Chester, Pa.—had the courage and energy to undertake the work of making the steel castings for the cruisers."

Mr. Scott of the Union Iron Works, which built the Charleston and are building the San Francisco, very properly contradicts this statement. He says as it applies to the Pacific Rolling-Mills it is untrue. They contracted to make the steel castings for all cruisers the Union Iron Works might obtain before any bids were opened at Washington. The bids of

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Alien Ownership of Tin Mines.

EDITORS PRESS:—Having read your article in the issue of Oct. 20th on the subject of "Alien Mine-Owners," I find that a committee of Congress has been appointed to investigate and report at the next session of that body. Now, while I agree that it is all very well to allow aliens to hold mining property of certain kinds in the States and Territories, but not all kinds, it is well known that foreigners buy gold and silver mines for the purpose of making and realizing a profit on their investment; and as those metals are always of a stipulated value, the sooner they can realize an income from them the better it is for the stockholders. But it is not the case with all kinds of mining. I allude more particularly to the article of tin. Now it is well known that English capitalists have monopolized and almost controlled the tin mining of the world, with perhaps the exception of the Dutch East India Company, who operate on the Island of Borneo in the East Indies.

The tin mines of Cornwall have been worked almost from time immemorial, according to statistics—say from 1500 to 2000 years—and the stock in those mines has been handed down from one generation to another to enrich a few at the expense of the whole world.

Now we have within 100 miles of this place, in the county of San Bernardino, at Temescal mountain, an immense deposit of tin ore, enough to supply the United States hundreds of years to come. This mine has been looked up with a lawsuit for over 25 years, and, if reports are true, it has only been decided a short time ago, and it is also reported that two Englishmen have been kept there to watch it all this time, and they are paid regularly from some source, but no one seems to know where it comes from. According to reports published in your paper, there are also large deposits of tin ore at Mt. Harns, in Wyoming Territory, of both vein and stream tin in inexhaustible quantities. There are also tin mines in Mexico, but there is no account of any shipments from that country. All the tin seems to come from England; and whenever a tin mine is discovered in any part of the world, an agent from England appears on the ground to investigate its extent and value, and if it is of importance enough to create a competition to their monopoly, what is the most likely thing for them to do? Of course, buy it, and lock it up. We hear of no tin being produced in Wyoming Territory, although we had reports of a company being organized in New York over two years ago to operate them. Have Englishmen been over and bought them off?

But why should they buy them off? For the very best reason in the world. It is well known that the mines of Cornwall are now being worked to a great depth, and miles under the sea; and in order for the stockholders to get dividends from them, they have got to keep up the price of tin to 22 and 25 cents per pound. It is said they work ore that only yields five per cent, and even as low as three per cent. What could they do in attempting to compete with American tin, where you can go and dig it out of the surface, that will yield 15 and 20 per cent, as it does here at Temescal? Now, if Cornwall miners can make it pay to work five-per-cent ore at 25 cents a pound, 15 and 20 per cent ore ought to be made pay, even to sell it at 15 cents a pound. Tin is a metal that as yet has been found in few places in the civilized world, and I do think that if Congress passes a law allowing foreigners or aliens to hold mining grounds in this country, there certainly should be an exception made in regard to tin miners. Tin is a metal that enters largely into scientific and domestic use, and to allow it to remain a monopoly in the hands of alien mine-owners, to be looked up or worked at their option, I think certainly would be one of the greatest mistakes that Congress could possibly make. At this very time a child cannot take a drink of water at the spring out of a tin cup without being indebted to England for that cup.

I venture to say that if aliens are allowed to buy and hold those mines, there will not be a pig of tin produced in the United States for the next two generations to come. Can the United States afford to do that when we are paying millions every year for foreign tin?

N. A. BEGOLÉ.

San Diego, Nov. 28, 1888.

[The alien law in regard to mines is not to apply to States, but to Territories. Whatever is finally done in the matter by Congress will have no reference to the subject in California or any other State of the Union, but will to the Territories.—Eds. Press.]

Mineral and Agricultural Land.

EDITORS PRESS:—It is generally conceded here among the mining class that the owners of agricultural patents, or the possessors of such, almost invariably have rich gold-bearing ledges upon the land. There is not a piece of patented land in this district but what has rich ore. In other words, productive mines. No person or persons can deny this.

Wiser's patented land has numerous pro-

ductive ledges that give an "A No. 1" showing for a big mining property. Also Miller's, better known as the Myers ranch, not less valuable than the former for mining purposes. Debrasky of Shasta, Georges of Shasta, and B. Swasey, all owners of patented land, have valuable gold-bearing quartz ledges on the land. Otherwise the mere land and timber is worth nothing until after five years of toilsome life. Some ledges are productive from the grass-roots, and the ore can be brought to the mill with but little expense. Here these ledges lie undisturbed, and will, perhaps, for many years to come. The Government has set aside our mineral land district from the agricultural land districts, and why do not the miners of this district join hands and prove up our mineral resources? J. C. FRICK.

Lower Springs, Nov. 25, 1888.

The Gold-Quartz Region of Idaho.

EDITORS PRESS:—The old placer region in Idaho, viz., about Leshburg, Salmon City, Gibbonsville, and on west to Warren's and Florence, is a most excellent quartz field. During the past year quite a number of rich discoveries have been made. It is free-gold quartz, from a granite, slate and porphyry formation. The veins are all sizes up to immense fissures. This great gold-field is about four times as large as the Black Hills of Dakota. Quartz mining in Idaho is still in its infancy. The day is coming when this great mineral belt will be the most important as a gold-silver producer of any other portion of the Northwestern Territories. Most of this Salmon-river region is yet unprospected. It is a rough, broken country, consisting of numerous mountain ranges running in all directions—a regular panorama of ruggedness. The geological character of the country is profoundly varied. In fact, about all rocks are represented in this section, especially the older series—volcanic, metamorphic, crystalline and sedimentary. A great many of the metalliferous veins are contacts, still there are numerous fissures in the broad zones of granite and porphyry. The country is well watered and timbered. Various kinds of game abound in this mountain region, such as elk, moose, deer, bear, mountain sheep and goat. All the larger creeks, rivers and lakes contain trout and salmon. It is a delightful country during the summer season for the prospector, and now since the Indian troubles are all over, there is no reason why this most desirable mining country should not be explored and the mines developed. Several railroads are heading this way, and it will only be a few years when the great mineral resources of this region will be known to the mining world. It will be made known by the stream of precious and useful metals that will flow from these rugged mountains of Idaho. The mines are here in goodly numbers, and their development will give fortunes to the fortunate owners. In a future article the writer will endeavor to give a more specific account and description of some of the gold-quartz mines that are now being worked in this Salmon-river region.

CHAS. F. BLACKBURN,

Salmon City, Idaho.

Careless Prospectors.

We have had occasion heretofore to refer to the practice of writing out location notices so vaguely that no one can tell the exact whereabouts of the property intended to be claimed. We condemn the practice decidedly, but it prevails to a considerable extent through ignorance and carelessness. Many notices are posted which contain no reference to immediate surroundings and no definite description by which the particular ledge sought to be claimed may be distinguished. Some of them may be moved a mile and made to apply to other than those ledges upon which they were originally posted. This is wrong, and not only wrong, but positively unlawful. The law contemplates that the posted notice shall describe the property in such a definite manner that no mistake can be made as to the exact location of the ground intended to be claimed, otherwise it is imperfect and illegal. It is just as easy to accurately describe a ledge as it is to write a shambling notice that "the undersigned" claims a ledge somewhere in Homer district, and by so doing the locator protects himself from intrusion and litigation. Half the disputes about mines originate in neglect to build proper monuments and in the posting of imperfect notices. Locators will do themselves and the district a service by complying with the letter of the law.

A claim must be fairly defined in some manner, and the law says distinctly that it shall be so described that any well-intentioned person may readily find it after an examination of the records. And the Index would give another hint: A vein must first be found before a location may be made. It is not sufficient that A has discovered a ledge and B locates an extension on the supposition that it continues its course into adjoining ground. B must also find it, or C may come in and discover it, in which case B is left out in the cold and has no rights in the premises which C is bound to respect.—Homer Mining Index.

The London Exhibit.

No enterprise of greater importance has come before the people of California since the State was organized than the proposed exhibition of her products in the City of London.

What will it do? In connection with the development of the resources of the State, the chief object to be sought for is an outlet for her products at the highest prices which the world is prepared to give. These prices we have hardly been in a position to obtain hitherto. The reason is apparent, because the product is new, the State is new, and the laws of distribution are only to be mastered by many years of trial and experience. Our early efforts met with encouragement until the time came when the production increased in so great a ratio as to make the problem of disposal and distribution one far too difficult for the experience of our producers to master. This same difficulty will only increase with time, as more available land is put into fruits and vines, and the endeavor to overcome this difficulty by inducing further immigration will only tend to complicate the chances for success, and make more certain the tendency to glutted markets and ruinous prices.

What must be done to right matters and bring us a profitable return for investment and labor is to find new avenues for disposing of and distributing those goods which we have and are likely to have. This can best be done by bringing to the centralized markets of the world our products and obtaining for them the highest ruling prices.

An exhibition in London would afford the most speedy method of bringing about the desirable state of affairs, consistent with the prosperity and growth of our State.

It may be asked whether it is desirable for us to try to compete with the pauper labor of Europe—for it is implied that we would aim to do so were we to exhibit our products in London. Were the State depending on manufactured goods, the product of hand labor and manipulation, it would scarcely be possible for us to succeed, but when we take into consideration that the articles we offer for sale are mainly the productions of new and fertile lands and are produced by the aid of labor-saving machinery, and when we further consider that our land-ownership in California is a simple affair, that every box of raisins or can of fruit has charged upon it only a State and county tax and incidental expenses of interest on investment, as against the old feudal systems of European land-ownership, where the tiller of the soil is a sub-renter, above him a larger renter, negotiator or agent—above him the lord who owns the land, above him an immense navy (Spain, for instance, has a navy second only to that of Great Britain, without India to support it, a great standing army, an aristocracy and a king), when it is taken into consideration that all of this body take their pay out of the box of raisins or can of fruit, we do not hesitate to aver that we can compete with the similar productions of Spain and Italy, and do so to our advantage, just so long as our system of land ownership exists as against that in vogue among the people of Europe. So true is the above proposition that we need only point out the fact that we have been able to supply bread and meat to the people of Europe, and were it not for the protective tariff of Austria, Spain, Italy and Germany, it would be impossible for the people in these countries to till their soil in competition with ours at all.

The question before us is of the utmost importance; it deserves the active co-operation of every one interested in the products of the State, and demands prompt and effective action.

Below are the names of the representatives of the various counties who are to meet in convention at San Francisco in the Chamber of Commerce on Tuesday, Dec. 18th, at 10 o'clock A. M. It is imperatively necessary that each and every delegate should be present, and each county should see that its own man is on hand, or represented by an efficient substitute.

The plan of the proposed exhibition has been warmly indorsed by the people of Southern and Central California, and some of the leading northern counties of the State. There should not be a single county unrepresented in the coming convention, for the work to be considered is of moment to each and every one of them.

Let each county make a grand effort to be represented properly in the London Exhibition and thereby insure a complete success for the entire State.

When once we have obtained a firm foothold in the markets of the world, and our products bring remunerative prices, it will no longer be necessary for us to go out seeking settlers and investors. Capital and energy will flock to California because it will be profitable for them to do so, and our State will enter upon a career of progress and greatness unequalled by any other in the Union.

Let all attend the convention, then, and let each county see that it is surely and properly represented at the Chamber of Commerce in San Francisco, on Tuesday, December 18th, at 10 o'clock.

Below will be found the names of the representatives chosen by the State Board of Trade:

Alameda—J. S. Emery, E. W. Playter, V. D. Moody and M. J. Kellar.
Alpine—Judge N. D. Arnot.
Amador—A. Caminetti.
Butte—John Bidwell, D. N. Friesleben, E. T. Reynolds and E. W. Fogg.

Calaveras—C. V. Gottschalk.
Colusa—Dr. R. A. Grey and J. B. De Garnett.
Contra Costa—E. B. Smith and Dr. Strentzel.
Del Norte—W. H. Woodbury.
El Dorado—Henry Mahler and Thos. Frasier.
Fresno—Thos. E. Hughes, A. B. Butler, T. C. White and Louis Einstein.
Humboldt—John Vance.
Inyo—Patrick Reddy.
Kern—R. E. Houghton and C. W. Brower.
Lake—D. C. Ramsey and P. B. Graham.
Lassen—C. C. Hutchinson and E. B. Spencer.
Los Angeles—Eugene Germain, E. W. Jones, Dr. J. P. Widney, M. L. Wicks and J. B. Lankershin.
Marin—F. C. de Long and Wm. T. Coleman.
Mariposa—Major Ben. C. Truman.
Mendocino—J. Mervyn Donahue.
Merced—H. H. McCloskey and Geo. H. Bonfield.
Modoc—J. J. Reavis.
Mono—W. B. Thompson.
Monterey—Jesse D. Carr and W. Nance.
Napa—M. M. Estee and Leonard Coates.
Nevada—C. W. Kitts.
Placer—A. P. Hall and P. W. Butler.
Plumas—C. Lee.
Sacramento—Dr. G. L. Simmons, Eugene J. Gregory, David Lubin, Chas. K. McClatchy and S. E. Carrington.
San Benito—Dr. Thos. Flint.
San Bernardino—L. M. Holt, J. G. Burt and A. S. White.

San Diego—Frank A. Kimball, T. S. Van Dyke and Chas. B. Turrill.
San Francisco—M. H. De Young, Col. J. P. Irish, G. K. Fitch, W. R. Hearst, Capt. W. L. Merry, Wm. H. Mills, Frank Dalton and A. T. Dewey.

San Joaquin—L. U. Shippee, S. D. Woods and J. A. Morrissey.
San Luis Obispo—J. M. Fillmore and W. D. Haley.

San Mateo—Timothy Hopkins and Alexander Gordon.

Santa Barbara—Ellwood Cooper.
Santa Clara—T. Beach, N. Cadwallader and W. C. Andrews.

Santa Cruz—John A. Shivor.
Shasta—C. W. Pope, T. W. Shanahan and Fred H. Deakin.

Sierra—Daniel Cole.
Siskiyou—Hon. John Daggett.
Solano—G. N. Platt and G. P. Plaisted.

Sonoma—H. W. Byington and John Adams.
Stanislaus—J. B. Caldwell and E. B. Beard.
Sutter—R. C. Kells.

Tehama—N. P. Chipman and Bruce B. Lee.
Trinity—W. J. Tinnin.

Tulare—W. R. McQuiddy and Capt. Thompson.
Tulumbine—J. D. Nicholls.

Ventura—H. M. Newhall.
Yolo—Chas. W. Reed and R. B. Blowers.

Yuba—J. B. Montague.

Gravel Mining.

The Industry as Now Prosecuted.

It is very certain that the auriferous gravel belt of California is far from being exhausted, remarks the *Call* editorially. The surface has been scratched; but that surface is merely the comparatively modern covering which dates from the later quaternary, in some places overlying the beds of the old rivers. Here and there a few of these old beds have been discovered and exploited for a few hundred feet. But by far the greater portion of them are buried under so deep a deposit of volcanic matter and detritus that they have never been reached. Portions of Mariposa, Tulumbine, Calaveras, Amador, El Dorado, Placer, Nevada, Sierra and Plumas are underlaid with gold, and sooner or later it will pay to delve for it and get it out. The gold-bearing belt may, indeed, run from the extreme southern limits of the State into Oregon. There are more chances that it does than that it does not. How much gold it does contain the most fertile imagination cannot presume to conjecture; but judging from what has been found in grubbing here and there in the old river channels and bars the quantity must be large.

The student of science will amuse himself by constructing theories to account for the presence of gold in the gravel. To the man of business it is enough to know that gold is there, and that with labor directed by skill it can be got out. There must have been a time when the surface of California was intersected in every direction with rivers and streams which flowed from a golden source; when the mighty power of water eroded this source and carried the gravel down, the gold came with it, and the fable of Paeolus was repeated in almost every portion of the State. Then came the period of volcanic overflow, and the age of natural detrital deposits, during which these great treasure vaults were hidden under vast layers of lava and dirt. It is the business of our time to reverse the process, to tear away the upper cloak of lava and debris, and to get at the river-beds where the precious metal was deposited by the water, and lies in its gravel envelope. In a word, the gold of the future in this State bids fair to be found rather in the "high gravels," which must be reached by sinking and tunneling, than in quartz veins. This will not be as easy work as the washing of the fifties, when a lucky miner on a rich bar cleared his thousand dollars a day. But with skillful direction and good luck, the industry may pay very well.—*Nevada Transcript*.

IMPROVEMENT IN TRACTION WHEELS.—In an invention relating to wheels for traction engines, made by Boulton, Ashton-upon-Tyne, England, wooden blocks are inserted in the face of the wheel, these blocks resting upon a cushioning material. This, it is said, effectually avoids the jar and shock incident to the running of such engines.

The Metropolis of the North.

No doubt many readers of the PRESS who hear so much of progress and development in our sister State, Oregon, will be pleased with a glimpse of the city of Portland from a recent photograph. To give also an idea of the picturesque surroundings of the city we include a sketch taken when Portland was a much smaller city, but which has the merit of showing the valley and the majestic Mt. Hood towering above the lesser heights which lie eastward of the city.

The city of Portland is situated on sloping ground, with the river on one side, and on the other a range of hills, which, within easy walking distance, rise to an elevation of several hundred feet above the river, and which afford the most picturesque building sites in the world. From the streets of even the thickly settled portions of the city, the Cascade mountains, with the snow-capped peaks of Hood, Adams, St. Helens and Rainier, are in plain view—the first named at almost any stage of weather, the latter three upon a moderately clear day. As the hills to the west of the city are ascended,

population of the city will be increased to 60,000 and over. The construction of two iron bridges across the river has done much to strengthen the feeling toward consolidation, and it would seem that corporations which are so closely identified in business interests should be one in fact.

As a center of transportation Portland equals, if it does not excel, San Francisco. She has competing transcontinental connection over three lines of railroad—the Northern Pacific, the Union Pacific (via its Short Line and the O. R. & N. Co.) and the Central Pacific in conjunction with the Southern Pacific. Three other local lines converge here, which extend southward and tap the rich agricultural region of the Willamette valley. The railroads which now center at Portland were not built by the people of that city, nor with their capital; but they were built for the same reason that the trade and commerce of the country centered here before their construction, and the cause for both is in the general lay of the country. The city is located at the confluence of the Columbia and Willamette rivers, at the point of discharge of a natural funnel, of which the mountain ranges act as the sides, bringing the waters, and with the waters the trade and com-

United States Mints.

Dr. Kimball, Director of the Mint, has submitted to the Secretary of the Treasury his report of the operations of the Mint service for the fiscal year ended June 30, 1888. The value of deposits of gold was \$80,894,456, including \$8,668,959 of redepósitos. The deposits and purchases of silver were 39,941,507 standard ounces of value, at a coining rate of \$41,822,846. This included redepósitos of the value of \$491,831. Of the gold deposits, \$32,406,306 was classified as of domestic production, against \$32,973,027 in the preceding year. These figures tend to a reduction of half a million of dollars in the production of gold in the United States. Foreign gold bullion deposited aggregated \$21,741,042, and foreign gold coin \$14,596,885, a total of \$36,337,927, against \$32,467,840 in the year preceding.

The value of United States light gold coin deposited for recoinage was \$492,512; old material was deposited in the form of jewelry, bars, plate, etc., containing gold of the value of \$2,988,750; of the silver bullion deposited and purchased, \$37,393,648 (32,315,156.79 standard ounces) was classified as of domestic production, \$1,668,384 as foreign silver bullion, and \$87,336 as foreign silver coin. The total coinage was 109,030,547 pieces, of the value of \$63,719,242, of which \$28,364,170 was gold, \$32,718,672 in silver dollars, \$1,417,422 in subsidiary silver coin and \$1,218,976 in minor coins. The minor coinage of the Mint of Philadelphia was the largest in the history of the Mint service, being occasioned by the demand for five-cent nickels and one-cent bronze pieces.

Gold bars were exchanged for full weight United States gold coin as authorized by the Act of May 26, 1882, of the value of \$15,846,936, against \$7,604,059 in the preceding year. Silver

The aggregate coinage of the world, including recoinage, during the calendar year 1887, was \$124,992,363 of gold and \$160,985,877 of silver. The value of gold bars furnished for industrial use during the calendar year 1887 was \$11,672,606; silver bars, \$5,241,998; total, \$16,914,604. The stock of gold and silver coins in the United States on July 1, 1888, is estimated to have been: Gold coin, \$595,349,837; silver dollars, \$299,708,190; subsidiary silver coin, \$76,406,376. At the same date there was gold bullion awaiting coinage in the mints to the value of \$110,469,013, silver bullion \$3,950,388, and melted trade dollars \$1,092,439,963. Of this there was in the Treasury of the United States \$594,533,172, in national banks \$105,435,492, and in other banks and in general circulation \$392,461,299.

The Engineers' Code.

The following signals, taken from the standard code, are used by the majority of the locomotive engineers employed on American railroads:

The sign **O** means a short, quick sound, while the dash — means a long sound.
 Apply brakes, stop **O O O**
 Release brakes, start **O O O**
 Back **O O O**
 Highway crossing signal — **O O O** or **O O —**
 Approaching station, — blast whistle 6 seconds. **O O O O**
 Call for switchman **O O O O**
 Cattle on track **O O O O**
 Train has parted **O**
 Railroad crossing, same as approaching station. **O O O O O**
 For fuel **O O O O O**
 Bridge or tunnel warning **O O —**
 Fire alarm **O O O O**
 Will take side track **— — —**

Red signifies danger; green signifies caution, go slowly; green and white signifies stop at flag stations for orders for passengers or freight. One cap or torpedo on rail means stop immediately; two caps or torpedoes means reduce speed immediately and look out for danger signal.

A MINER'S BAROMETER.—“We will have snow or rain before to-morrow, and the storm will be a heavy one,” remarked a veteran miner yesterday. “My barometer is infallible. I am working in a long tunnel, and when the



EARLY VIEW OF PORTLAND, THE WILLAMETTE AND MT. HOOD IN BACKGROUND.



A GENERAL VIEW OF THE CITY OF PORTLAND, OREGON.

the view broadens, until from the extreme top of some of the higher points there is a panoramic view unequalled in few localities in the country. But not alone has the resident of Portland these advantages of a beautiful outlook over the face of Nature. To the glaciers of Mt. Hood is but a little more than a day's travel; the gorge of the Columbia may also be visited within the compass of a day; the upper Willamette, within the limits of a few hours' trip, offers beauties equaling the Rhine; while 36 hours gives the lower Columbia, beside which the Hudson sinks into insignificance. Within a few hours' walk are beauties rivaling the White mountains, and the grandeur of the Alps lies within the limits of a day's picnicking. Upon the higher ground of the city many elegant homes have been made. A city park, overlooking the river and valley, has also been laid out, and is being rapidly improved.

Portland has a present population of 50,000. All movement is now on foot, by petitions to the next session of the Legislature, to bring about the annexation of East Portland, and possibly Albina, both on the opposite side of the Willamette river. If this is effected, the

merce, of a great extent of country together at her doors. Between the Coast and Cascade ranges of mountains is a stretch of fertile lands, in extent double the size of Massachusetts, which is compelled to seek its outlet at Portland. The country to the north and east of the Columbia is also largely tributary to Portland, and the city finds a great business at present in supplying this vast territory with goods and receiving in return its grains, stock and minerals.

At the taking of the census of 1880, Portland was the third wealthiest city in the world in proportion to population. Among all her wealthy men, not one can be singled out who did not make his money in that city—who did not come comparatively poor to grow rich by his well-directed labors. The same causes that made Portland grow in wealth in the past are at work to-day causing the increase of her trade and wealth. She can now point to a jobbing trade of \$60,000,000 per year, which is a fair index of the extent of her relations with the regions penetrated by rail and reached by river from this focal point of the North-west.

ver hers were manufactured to the value of \$59,313,015, and 1397 medals were manufactured. The average cost per fine ounce of all silver published for the standard dollar was 095.47.

The seignorage on the coinage of silver dollars during the year was \$8,407,922, and on subsidiary coinage \$71,191. The seignorage on the coinage of silver from July 1, 1878, to June 30, 1888, amounted to \$47,536,680. The earnings of the mints and assay offices from all sources amounted to \$9,788,592, and the expenditures and operative losses to \$1,534,209. The total imports of gold coin and bullion during the year were \$43,934,317, and total exports \$18,376,234, or an excess of imports of \$25,558,083. There was a net loss of \$8,238,788 by the export of silver. The production of gold and silver in the United States for the calendar year 1887 is estimated to have been \$33,000,000 of gold and \$53,357,000 of silver. The production of gold throughout the world has remained nearly constant, while the production of silver has increased in the last four years about \$25,000,000.

weather is fair candles burn brightly in the face, but when a storm is approaching they burn more dimly, and when they are extinguished I can count on a storm in less than 24 hours to a dead certainty. This morning, before I had passed through one-half the tunnel's length, my candle was extinguished as suddenly as if it had been snuffed out, which conveyed a double warning—that a heavy storm was approaching and that I must take a holiday until it is over, as the extinguishing of the candle indicated that the light atmosphere outside would not admit of the foul air passing out of the tunnel, and where a candle will not burn in underground workings every miner knows a man cannot live.” The miner's simple barometer is certainly more reliable than modern weather prophets and costly mechanical devices for indicating the approach of a storm, as it began snowing in less than 12 hours after the above conversation.—*Virginia Chronicle*.

THE rigorous application of the chain-gang remedy has pretty nearly cleared Napa of tramps.

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W. B. EWER.

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SAN FRANCISCO

Saturday Morning, Dec. 15, 1888.

TABLE OF CONTENTS.

EDITORIALS.—A Terebo-Proof Pile Covering; Pacific Coast Steel and Ship-Building, 393. Passing Events; Alien Mine-Owners; Morongo Mining District; C in Certificates for Gold and Silver; Rolling Seamless Tubes, 395. A Plate Amalgamator, 397.

ILLUSTRATIONS.—Iron-Jacketed Piles for Wharves, 393. Rolling Seamless Tubes by the Mannesmann Process; Gauthier's Vibrating Amalgamating Plates for Quartz-Mills, 397.

CORRESPONDENCE.—Alien Ownership of Tin Mines: Mineral and Agricultural Land; The Gold Quartz Region of Idaho, 394.

MISCELLANEOUS.—Careless Prospectors; The London Exhibit; Gravel Mining, 394. The Metropolis of the North; United States Mint; The Engineers' Code, 395. Technical Training in Public Schools, 399.

MECHANICAL PROGRESS.—Mittis Metal—What is It; Curiosities of Alloys; Hard Steel; Mushet Steel; Weight of Different Kinds of Iron, 398.

SCIENTIFIC PROGRESS.—Chemical Action Between Solids; A Remarkable Spring; How Main-springs of Watches, Lamp Chimneys, etc., Break; Improved Telescope; Pile Driving; The Earth's Cloud Belts; Danger in Dust; A Significant Fact, 398.

USEFUL INFORMATION.—Effect of Time on Slaked Lime; Silvering Iron; An Ingenious Railway Appliance; The Game of Marbles in England; The Military Drill for Ladies; Tree Growth; Camel's Hair Belling; Dredging the Thames; Vegetable Growth on a Telegraph Wire; Etching Mixture; A Babel of Languages, 399.

GOOD HEALTH.—The True Cause of Baldness; Public Health; Nursing Our Aches and Pains; Why Women Swim Well; Effect of Climate and Change of Location on Longevity; Interesting Statistics, 399.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 396-97.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 404.

Business Announcements.

[NEW THIS ISSUE.]

San Diego Asbestos Mining and Manufacturing Co. Gold Mine Wanted—J. H. Meyer & Co. Delinquent Sale—William Penn M. & Co. Situation Wanted by Mechanical Draughtsman—H.

See Advertising Columns.

Passing Events.

The order to close down the Anaconda copper mines, M. T., followed next day by one to continue operations, grew out of differences between the mining and railroad company, and had nothing to do with the copper market. The mines are again being worked, greatly to the joy of the people of Anaconda.

While the abundant rains which have fallen in this State will stop the operations of river-bed miners, the water will set a good many mills going which have been entirely or partially stopped during the fall months.

The exhibition of California products by the State Board of Trade, which leaves this week for the East in two cars specially prepared for it, will prove an excellent advertisement for this State. The cars will be taken to different parts of the United States. The exhibit is permanently arranged for inspection.

Great attention is now being paid to electrical power for running quartz-mills and hoisting ore. The large plant on the Comstock will soon be ready for use, and in other places excellent practical results have been obtained.

The tunnel of the Hidden Treasure gravel claim at Auburn is now in 8000 feet, and the gravel is very rich.

Alien Mine-Owners.

The subject of alien ownership in mines is being investigated by the Government of the United States in view of probable changes in the Alien land law. We have several times referred to this subject, contending that no harm is done in permitting foreign companies to purchase mining property in the Territories of the United States. On the contrary, a definite benefit is the result. The companies buy the mines from the discoverers and develop the properties, putting up expensive plants and spending money in regions where money is needed. Many examples could be cited to show where the expenditure of capital has benefited highly not only our citizens, but the regions where the mines are located. Many of the ventures have been unprofitable, it is true, perhaps more of them than have shown a balance the other way, but this is perhaps due more to the fact that fancy prices have been paid to middlemen than to any other reason. Last week, during the visit to this city of Mr. Ivan C. Michels, statistician of the Committee on Mines and Mining, U. S. Senate, we questioned him concerning what he had thus far noticed in looking up this question, which was the principal reason of his presence on this coast. He said:

"On my trip to Utah, Idaho, Montana and Wyoming Territories, I have found so far the foreign capital invested, with very few exceptions, has been very unprofitable. The mines have been sold in England, France and Germany at very high figures, thus handicapping the mines from the start as to declaring dividends. Another cause of complaint is that parties have been sent from Europe who really have no knowledge of mining at all. They erect expensive works, getting expensive machinery, economize in no way, charge themselves with very high salaries, indulge in expensive living, and very seldom attend to business. There are more of these mines owned by aliens in Montana and Utah than any other places.

"I am on my way to Arizona and New Mexico, but so far I have not been able to get a full list of all the mines owned by aliens, but expect to have a complete one by the first of January."

Morongo Mining District.

The district of Morongo is in San Bernardino county, about 70 miles from the town of San Bernardino and 100 miles from Colton. By wagon-road, it is 60 miles from the S. P. R. R., an equal distance from the A. P. R. R., and 44 miles by trail from Whitewater Station, S. P. R. R. The miners make one day's drive from Whitewater Station. Only a few mines are thus far opened in the district, but some promising prospects have been made of late. There are no mills as yet, but arrangements are now being made for machinery.

Mr. Joseph Johndrew of this district was in the city this week, and from him we learn some facts concerning the mines. The most prominent one is the Morongo King. Water is obtained for the mine at Antelope springs near by, and a mile distant is a good millsite between the water and the mine.

The ledge runs northeast and southwest, and is about 15 feet wide on the surface. At the bottom of the shaft—200 feet deep—the ledge is about the same width, the ore improving with depth. The ore is all free-milling, and there are 200 or 300 tons on the dump ready to be worked. The owner has been working some of the ore in arastras to "keep going" during the past eight years. It has averaged about \$20 a ton in gold. In some places there are rich spots that assay up to \$500 and \$600 per ton. There is plenty of wood and water in the district.

Quite a number of miners are now in the district prospecting and working for themselves. The climate is fine and work can be carried on without difficulty all winter—in fact it is pleasanter to work there in winter than in summer, though it does not get very hot in these mountains. The district is not new, but is only now attracting outside attention.

A Volcano has broken out in the State of Tabasco, Mexico. The political chief of the municipality of Huamantla reports to Governor Sarlat that the mountain of Mono Pelado is in eruption.

Coin Certificates for Gold and Silver.

A bill introduced by Senator Stewart of Nevada in October last is a matter of interest to miners of gold and silver. It provides for the issue of coin certificates. Anybody having five ounces of gold or 80 ounces of silver may deposit them at any mint or assay office of the United States and receive full coinage value for the gold and silver deposited, thus virtually establishing the price of silver as \$1.29 per ounce instead of the present price of about 94 cents. This gold and silver is to be melted and formed into bars, and the coinage of gold and silver shall be done whenever there is a demand for coin. Should this bill be passed, it would abolish the Act of Feb. 23, 1873. The full text of the bill is as follows:

A Bill to provide for the issuance of coin certificates to circulate as money.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that any person may deposit at any mint or assay office of the United States either gold or silver bullion, or both, in quantities of not less than five ounces of gold or eighty ounces of silver, and demand and receive coin certificates therefor, at the rate of one dollar in certificates for twenty-five and eight-tenths grains Troy weight of standard gold, nine-tenths fine; and at the rate of one dollar in certificates for four hundred and twelve and one-half grains Troy weight of standard silver, nine-tenths fine.

The coin certificates issued under the provisions of this section shall be of such denominations as the Secretary of the Treasury shall prescribe, provided that they shall not be of less denomination than one dollar or more than one thousand dollars, and that one-half of the amount issued shall be in denominations less than fifty dollars, and shall be redeemable in gold or silver coin at the option of the United States. And the Secretary of the Treasury shall cause to be coined from time to time such portions of the bullion deposited under the provisions of this section as may be necessary to enable him to furnish coin for the redemption of such certificates.

The coin certificates issued under the provisions of this section shall be a legal tender at their nominal value for all dues, public and private, except where otherwise expressly stipulated in contracts heretofore made, and when such certificates shall be received for public dues they shall be reissued. And a sufficient sum to carry out the foregoing provisions of this section is hereby appropriated out of any money in the Treasury not otherwise appropriated. And the provision in Section one of the Act of February twenty-eighth, eighteen hundred and seventy-eight, entitled, "An Act to authorize the coinage of the standard dollar and to restore its legal-tender character," which requires the Secretary of the Treasury to purchase at the market price thereof not less than two million dollars' worth of silver bullion per month, nor more than four million dollars' worth per month of such bullion, is hereby repealed.

PLAIN AND TWISTED IRON.—Lieutenant F. P. Gilmore, U. S. N., who is here on duty inspecting the material used in the construction of war vessels, addressed the Technical Society on Friday last, on the relative strength of plain and twisted iron and steel bars. As the question had been raised whether iron rods used in the construction of cement sidewalks were weakened by first twisting them, in order to make the cement hold, Lieut. Gilmore volunteered to conduct some experiments at the Rolling Mills and the Union Iron Works, and submit the result to the society. A large number of tests had been made by him in the most accurate manner, and the result proved that twisted bars of iron or steel will bear a greater tensile strain than before being twisted. As many as 13 turns were made in a three-quarter inch steel rod eight inches long before it broke, while rods of iron of the same dimension broke at 3½ and four turns. Mr. Gilmore stated that iron and steel will bear a greater strain a few weeks after it has been manufactured than it will immediately after leaving the mills. He paid a handsome compliment to the Pacific Rolling Mills and Union Iron Works, and said he was not a little surprised on his arrival here to find such extensive and perfect plants for turning out heavy work, and particularly with the great variety of work handled by these concerns.

SENATOR REAGAN has introduced a bill for the free coinage of silver. It provides that all holders of silver bullion of the value of \$50 or more shall be entitled to have it coined into standard silver dollars of 412½ grains Troy to the dollar upon the same terms and conditions as gold is now coined for private holders.

QUARTZ showing good assays in gold has been found in Jimbo district, west of Mount Davidson, Nev.

Rolling Seamless Tubes.

A system of rolling seamless tubes from solid bars or ingots by what is known as the Mannesmann process is attracting great attention in England and Germany. Mr. Frederik Siemens described it in detail before the British Association, and the *Iron Age* gives his paper with engravings, which we reproduce, (see next page.)

The process consists generally in a method of rolling metal into seamless tubes, and it will contribute greatly to increase the use of steel. Tubes occupy an important place in the wants of mankind. Besides their use as tubes, properly so-called, they possess, also, the most advantageous form for columns, rods, axles, bearings, struts, etc. A given quantity of material can be formed into no shape so strong as the tubular.

Hitherto steel tubes could only be made with difficulty and at high cost by a complicated process with imperfectly welded seams and a longitudinal fiber. Now from a rough ingot of cheap steel with one, or at the most two, operations, a perfect tube without seam and with a circular fiber is produced. It may be seen from this bare statement how great is the importance of this invention. By the process in question tubes of great length and diameter, and of almost any desired thickness of metal, can be produced at a comparatively low cost.

At the present time, to roll a bar of iron, two horizontal rolls, as shown in Figs. 1 and 2, revolving in opposite directions, are used. If the section of the finished bar is required to be of any given form, grooves are cut around the rolls of the sectional form which the bar is required to assume. Passed longitudinally between the revolving rolls, the bar is forced into the grooves and reappears molded to the desired form. The rolls do not make the bar revolve, they act simply on its surface, drawing the material forward, and forcing it into the prepared grooves, at the same time elongate it and reduce its sectional area. The fiber produced in the finished product is, of course, longitudinal. Tubes are also made in this way. The prepared sheet of wrought iron is bent till the sides overlap and the longitudinal seam thus made is welded while passing through the rolls on a mandrel placed inside. The ordinary patent welded wrought-iron tubes made in this way have also a longitudinal fiber.

Another way (Figs. 3 and 4) of rolling is known and is used for straightening and polishing bars to which a rotating motion is imparted by two or three rolls revolving in the same direction. These rolls are for the most part placed parallel to one another, and the bar to be operated on is introduced in the direction of their longitudinal axis—that is, at the ends instead of at a right angle to the rolls. In such rolls the bar is not drawn forward but simply rotates, and if sufficient pressure is given the bar is elongated, but no decided fiber is produced.

Between the two kinds of rolling described above, which may for convenience be called longitudinal and circular respectively, another system of polishing and straightening bars and tubes occupies a kind of middle position. So also does the Mannesmann tube-rolling process. The systems differ, however; the first acts on the surface only of the bar or finished tube, whereas the latter actually makes the tube, and, in making it, displaces the material of the bar or ingot acted on, and imparts to it a fiber running in a spiral around it.

In both systems two or three rolls may be used together, turning in the same direction, and, consequently, imparting a rotating movement in the opposite direction to a bar laid between them. The two or more rolls (Figs. 5 and 6), however, do not lie normally, nor even parallel, but at angles to the axes of each other, and the axes of these rolls cross one another and that of the bar, forming somewhere in space acute angles in opposite directions with each other, and with the bar lying between them. When thus set the rolls act on the bar to draw it forward as well as to make it revolve—or, in other words, they impart to it a spiral movement. Though constructively both systems of mills may appear much the same, they differ widely in their mode of working and in their results. This arises from the position which the article acted upon and which we will continue to call a bar, is made to take up, and the very different action and form of the

rolls. In the Mannesmann machine a certain relation is maintained between the forward movement of the bar and its rotating movement, and if the proportion between longitudinal and rotary motion is properly adjusted to the special material acted on, the displacement in the substance of the bar is regulated so that a systematic twist is given to the fiber, by which not only irregular breakage of the material is avoided, but an energetic working action is secured, causing the great strength and toughness the tubes produced by this process are proved to possess.

The old straightening and polishing machine, although outwardly similar to the Mannesmann

rotates increases and it is drawn forward by each succeeding pair as they catch hold of it with ever-increasing speed.

It will be understood that a bar passing through such a series of disks, no slipping being possible, the material of which it is composed cannot retain its original area or volume. The diameter of the bar being regulated by the disks, while simultaneously a violent stretching action is carried on, the material required can only be drawn from the inside of the bar, and thus a hollow space is formed. Instead of this peculiar arrangement of disks, a conical or rather conoidal pair of rolls, which amount to the same thing as the disks,

A Plate Amalgamator.

In the ordinary amalgamating device which receives the ore pulp from the battery, the silver amalgamating plates are usually placed at a considerable inclination and a good deal of water is used so as to effectually carry away the sand. This object could not otherwise be accomplished in the use of the ordinary plates, because they are stationary, and if they were set at a slight inclination and but little water were used the sand could not separate easily.

Apolinaire Gauthier of Grass Valley has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency a plate amalgamator in

at will. Normally, the machine acts positively on its sills on the floor; but to move it closer to or further from the mortise, rollers are put in the sills, which wheels travel on fixed tracks on the floor. The wheels or rollers are in vertically sliding bearings, and can be moved up or down by hand-screws. When the machine is in place, the wheels or rollers are withdrawn into the sills, so the sills rest on the floor, but when the machine is to be moved, the wheels are projected so as to raise the whole machine up on the tracks, thus providing for its easy motion.

By the construction described, and shown in the engraving, the inventor is enabled readily to regulate the inclination of the machine, and to impart to it a necessary shaking motion, and at the same time he can adjust the machine perfectly with respect to the battery.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 250 Market St., S. F.

FOR WEEK ENDING DEC. 4, 1888.

- 393,883.—SAFE LOCK—W. M. Brown, Jr., Sacramento, Cal.
 393,822.—MACHINE FOR STUFFING HORSE COLLARS—S. H. Ewing, S. F.
 394,067.—BICYCLE—Sands Forman, Gold Hill, Nev.
 394,068.—WHEEL—Sands Forman, Gold Hill, Nev.
 394,112.—GOLD SEPARATOR—J. S. George, Newport, Or.
 394,074.—STATION INDICATOR—John Knight, S. F.
 393,766.—HOOK FOR SEWING MACHINES—Kohler & Lachman, S. F.
 393,839.—ROLLER AND GRAIN DRILL—O. C. Kroh, Ripon, Cal.
 393,994.—SPARK ARRESTER—E. M. Luckett, Sacramento, Cal.
 394,077.—STATION INDICATOR—B. W. Lyon, S. F.
 393,847.—HEADER AND THRASHER—J. Minges, Atlanta, Cal.
 393,931.—WASHING MACHINE—S. J. Smith, Truckee, Cal.
 394,029.—CARBOLIC SMOKE-BALL HOLDER—A. J. Spinner, S. F.
 393,945.—TAMPING TOOLS—Waldron & Bolter, Folsom, Cal.
 393,952.—ROPE CLAMP—J. W. & A. B. Wood, Tacoma, W. T.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DREDGER DIPPER.—Manley C. Lawton, Staten Island, San Joaquin Co. No. 393,439. Dated Nov. 27, 1888. The invention relates to that class of dredger dippers in which opposing jaws of the clam-shell pattern are pivoted to a carrying frame and are operated by a sliding crosshead connection and pulleys and chains. The ordinary clam-shell dipper has its jaws pivoted on a common shaft in the center of the frame, and they can therefore open only their own width. The advantage of the improved dipper is that, opening to such a width, it has a greater cut and freer dump. In this one the jaws of the dipper are pivoted in parallel planes by rods at the extremities of the dipper-frame, closing to the center and opening out their full width beyond the sides of the frame.

MECHANICAL MUSICAL INSTRUMENT.—George F. Wells, S. F., assignee of one-half to Manley C. Lawton. No. 393,450. Dated Nov. 27, 1888. This invention relates to that class of musical instruments in which a strip of suitable perforated paper is caused to travel over the apertures in the range, said instruments being of the general organ type, known as automatic. The invention relates especially to a power apparatus or motor for effecting the travel of the perforated paper. The main object is to provide a motor for this class of instruments of such a nature and so operated that, without interference with the main functions of the pedals—namely, that of operating the bellows, it shall transmit its power to effect the travel of the music-paper, permit variation of its rate of speed, and allow for its proper control, so as to give a variation of tune to the music according to the will of the performer. Means are also provided for rapidly rewinding the music-roll. The invention consists essentially in the combination, with power-transmitting mechanism by which the travel of the paper is effected, of a motor of suitable construction, whose operation is effected by springs, the power of which is developed and controlled directly or indirectly by the pedals. In connection with this is a suitable speed regulator by which the speed of the motor may be varied independently of the stroke of the pedals and of the consequent power transmitted to the bellows of the instrument.

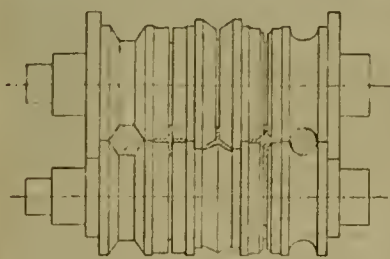


Fig. 1.

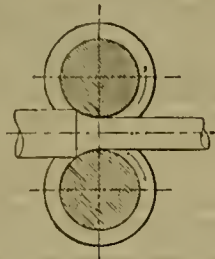


Fig. 2.

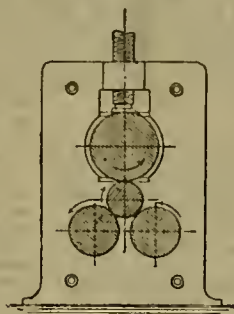


Fig. 3.

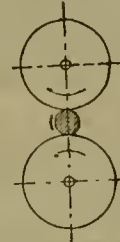


Fig. 4.

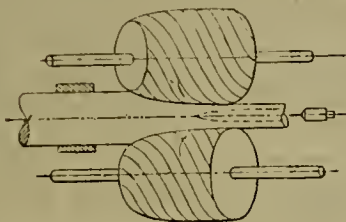


Fig. 5.

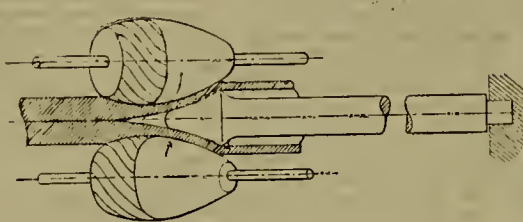


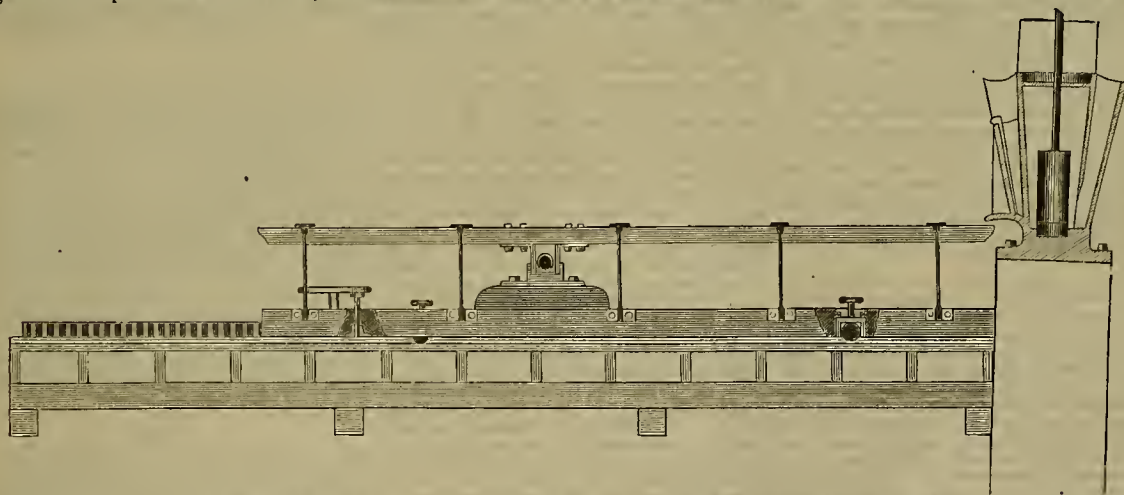
Fig. 6.

ROLLING SEAMLESS TUBES BY THE MANNESMANN PROCESS.

tube-rolling machine, owing to the form and position of the rolls and bars, admits of no twisting and displacement of material, and, consequently, this machine confines itself to surface action, as, indeed, it professes to do by its title. The following remarks may assist in clearing up this singular difference, and explain the peculiar action of the Mannesmann roll, which, while acting on the outer surface of a solid bar, produces a regular hollow space inside the same—in short, a tube. To obtain a single forward spiral action of the bar, the

considered as joined together, may be provided. It follows that a bar or rod of suitable dimensions which is passed through the Mannesmann rolls will, provided its substance is sufficiently homogeneous and plastic, undergo a violent twisting and stretching action, the fiber being spun as is the fiber in a rope, on account of which the process may be called a torsional process. The bar in its passage through the rolls is twisted as thread is twisted in a spinning machine. As, however, it cannot be fed from the outside as is the thread, and as the diameter

which the plate surface is given a vibratory or shaking motion. The top frame of the machine which is shown in the engraving on this page, carries the amalgamating plates. This top frame is supported from sills by means of spring standards. The inclination of the frame and its plate surface is a very slight one. The upper end of the plate surface is just under the apron of the battery mortar and receives the ore pulp from it. The vibratory or shaking motion is imparted to the frame and plate surface by an eccentric upon a rotary drive-shaft



GAUTHIER'S VIBRATING AMALGAMATING PLATES FOR QUARTZ MILLS.

length of the rolls is immaterial; it will take place when the rolls are reduced to the form of thin disks. Supposing the disks to be infinitely thin, or what is the same thing, that their outer edges are reduced to a mathematical line and no sliding motion takes place, the bar must still move forward spirally, its spiral velocity being equal to the velocity of the outer circumference of the disks. If, instead of one pair, several pairs of thin disks of regularly increasing diameters are made to revolve on the same axes, the outer circumference of each disk will revolve with greater rapidity than the preceding one. The same bar is, however, drawn forward through the several pairs of disks, and thus, as each part of the bar enters successively a more advanced pair of disks, the velocity with which that portion of the bar

cannot be reduced on account of the action of the rolls, it is forced to draw on the interior for a supply of material. It will be seen that we have in the Mannesmann process a system of rolling as new as it is capable of producing effects hitherto not contemplated. The hollow in the interior of the bar is produced without the intervention of a mandrel. Though the bar is converted into a tube by the action of the rolls, a mandrel is generally used to finish and smooth the interior and enlarge the tube.

THE output of the Green coal mine at Cherillos, N. Mex., on Monday last filled 105 cars.

A BILL has been introduced in Congress to repeal the Interstate Commerce law.

extending transversely, this eccentric playing between jaws bolted up under the top frame. This eccentric is driven at a high speed, so that the plate surface is moved back and forth with a longitudinal shake on its spring standard.

The inventor claims that more quicksilver can be used on these plates without subjecting it to loss or waste, while at the same time the sand is disposed of without having to use much water. To effect these results this amalgamating surface is set at a very slight inclination, and more quicksilver is used. The inclination being slight, the quicksilver has little tendency to flow off, and by reason of the shaking motion there is no necessity for using much water, the sand being separated without it, and the quicksilver remaining. The inclination of the plate-frame and plates is subject to regulation

MECHANICAL PROGRESS.

"Mitis" Metal—What Is It?

The name "mitis metal" has recently been given to a peculiar modification of wrought iron or steel, by which such refractory metals are made more easy to melt than in their ordinary conditions. These castings are produced by adding small quantities of aluminium, or aluminium alloy, to molten wrought iron or soft steel. This addition has the effect of lowering the melting point of the iron, so that the contained gases are allowed readily to escape, and the metal is rendered so fluid as to run freely into the smallest mold. Mitis castings are easily welded and worked, and are good substitutes for complicated smiths' forgings in iron or steel. The strength and toughness of the cast metal being fully equal to that of the best wrought iron admits of extreme lightness in the castings; and by increasing the percentage of carbon, tools and parts of machinery may be produced of any desired degree of hardness.

These characteristics open a wide field of application for the new metal or alloy. This field will be still further enlarged by improvements which tend to cheapen the cost of aluminium, which enters somewhat largely into its composition.

A casting of "mitis" metal is entirely devoid of the brittleness of ordinary cast iron, being very much like fine wrought iron, and may be drawn out under the hammer, welded, punched, or otherwise worked. "Mitis" castings can be produced of any degree of hardness, and when, as already intimated, through the wonderful strides which are being made in the science of electricity, the electric furnaces are brought to such perfection that aluminium can be produced at a price which is not prohibitive, it would seem that castings of "mitis" metal will take the place of forgings very generally.

The name given to this metal seems to be very appropriate—the term "mitis" is from the Latin and means soft or mellow. It is applied more to the process by which its peculiar characteristics of softness, flexibility and ductility are secured, than to the metal itself.

Discovery and Method of the Process.

The discoverer of this process was Mr. Peter Ostberg of Stockholm, Sweden. In the process of the manufacture of "mitis" iron the wrought-iron scrap is melted in plumbago crucibles in a special reverberatory furnace fired with petroleum. The crucible is covered, and a hole in the cover corresponds with, and is directly under, a hole in the top of the furnace. Additions to the charge of the crucible are made through these holes by means of a pipe, thus avoiding the necessity of opening and cooling the furnace. Wrought iron fuses at a temperature of say 4000° Fah., and it would be necessary to heat it far beyond the point of fusion before it would be fluid enough to cast into molds and to make it possible to handle it before it would consolidate. Now, it is in this unheating that the iron absorbs gases, and consequently it is impossible to make solid castings in this way.

In order to obviate this difficulty, Mr. Ostberg has made use of the well known fact that certain alloys of metal possess a fusing temperature much lower than that of the metals composing them; and among these aluminium alloys are especially notable. In making mitis castings, a very small quantity, about five-hundredths of one per cent of aluminium, in the form of a seven or eight per cent aluminium alloy of cast iron, is added to the charge (about 60 pounds) of wrought iron in the crucible the moment this has been melted. The fusion point is at once once lowered some 500° and the charge, now an alloy of iron and aluminium, becomes extremely fluid and can be cast in the finest molds, while the great difference between its temperature and its fusing point gives all the time necessary for manipulating it without danger of its solidifying. The extreme fluidity of the charge allows the ready escape of gases, which otherwise would make a porous casting, and the result appears to be a remarkably fine, solid and tough casting of wrought iron.

These mitis castings are said to be from 30 to 50 per cent stronger than the iron from which they are made.

A singular and rather depreciatory circumstance connected with these castings is the fact that although the aluminium greatly increases the strength of the iron in a casting, it loses a large portion of that increase of strength after hammering, and returns to the strength and fibrous appearance of fracture of the original iron. This, however, is of but little consequence, as the castings need no hammering.

The alloys of aluminium and iron and steel have long been known, and reference is made to the addition of such an alloy to steel by Faraday only a few years after the discovery of aluminium; but this application to wrought-iron castings is both new and interesting. No other process melts wrought iron and thus produces a wrought-iron casting. An important change in the manner of making the molds is necessary, different grades of sand being required from the other styles of castings, while it is necessary to dry the molds before they are used.

Another noteworthy feature of this iron is that no annealing is necessary, the castings being ready for the market from the sand. The castings made are designed to take the place of blacksmith forgings, and an examination of their qualities shows the ductility of malleable

iron with a corresponding absence of the brittleness of ordinary castings. The castings are really not castings in the common acceptance of the term, though made from liquid metal, but are wrought iron molded into shape.

This patent process is now the property of Mr. Nordenfelt, of gun and ammunition notoriety. Not only is the improved process of melting being applied to the production of wrought iron and steel castings, but for other purposes, and wherever adopted it has proved highly beneficial. By the successful adoption of the process, a new era has been opened out in the iron and steel world. Wrought iron is now used in commerce by being rolled and hammered as near as possible into the form of the article required, and by the subsequent treatment of the engineer and machinist, planed, turned, bored, slotted, and otherwise shaped and manipulated; thus the articles desired are eventually produced at considerable cost. The mitis work is turned out perfect directly from the mold in any shape desirable. The process is now in use in Sweden, St. Petersburg, Russia, Sheffield, England, and in the United States.

CURIOSITIES OF ALLOYS.—The way in which an alloy of gold and copper or other metal is affected by a small quantity of impurity presents one of the most serious difficulties with which our case-makers and jewelers have to deal in working gold, and referring to this, in a lecture at Birmingham, Professor Austen of the Royal Mint said: "It may be well to demonstrate the fact. Here are 200 sovereigns. I will melt them, and will add, in the form of a tiny shot, a minute portion of lead amounting to only the 2000th part of the mass; first, however, pouring a little of the gold into a small ingot, which we can bend and flatten, thus proving to you that it is perfectly soft, ductile, and workable. The rest of the mass we will pour into a bar; and now that it is sufficiently cold to handle, you see that I am able to break it with my fingers, or, at least, with a slight tap of a hammer. The color of the gold has become orange-brown; and the tenacity of the metal has been reduced from 18 tons per square inch to only five." In the same lecture Professor Austen said: "Here is a bar of tin, two feet long and one inch thick, which it would be most difficult to break, though it would readily bend double. If only I rub a little quicksilver on its surface, a remarkable effect will be produced—the fluid metal will penetrate the solid one, and in a few seconds the bar will, as you see, break readily, the fractured surface being white, like silver."

HARD STEEL.—Some experiments have been made by M. Osmond before the French Academy of Science, showing that if a bar of hard iron be allowed to cool from a white heat to dull redness, there is a spontaneous disengagement of heat, and its magnetic properties suddenly change. In order to ascertain whether the result might be due to the heat set free by the modification of the iron, or if it required the presence of carbon, M. Osmond operated with iron containing from 0.16 to 1.25 per cent of carbon, and found the first phenomenon above mentioned to be due to the molecular transformation of the iron, and the second corresponding to a change in the relations of the iron with its carbon. It takes place in 675° O., when the thermometer suddenly stops and rises to 681° C., afterward resuming its regular fall as the metal cools. This was observed with steel containing 0.57 per cent of carbon; with only 0.16 per cent of carbon a much slighter effect of the kind was noticed about 749° C. With 1.25 per cent of carbon, the two effects appear to confound themselves. When the proportion of carbon is increased, the temperature of transformation of the iron seems to be lowered and that of recalcence raised, so that both come to coincide in hard steel.

MUSKET STEEL. says a correspondent of the *American Machinist*—J. Torrey—owes its peculiarities to the presence of the metal tungsten, which is usually obtained from its principal ores, wolframite, and resembles iron in properties physically, though not chemically. The steel in question is said to be made by mixing wolframite with its own weight, or about that proportion, of pitch, and adding this mixture to an ordinary crucible charge of steel, the whole being subsequently melted at a high temperature. It is claimed that the product is of great value as a tool steel, from the fact that it does not need hardening and wears very slowly indeed. The experience of machinists with it has been rather different. I have had a small experience with it myself, and have, in some cases, found it all that was claimed for it. In other cases, results were not so good. Perhaps the working of it was the trouble. At all events, it is a very difficult steel to work, and usually costs a blacksmith some time and patience. A uniform product, which would be like some samples I have handled, would be invaluable.

WEIGHT OF DIFFERENT KINDS OF IRON.—The average weight of a cubic inch of wrought iron is .28; of a pound; a cubic foot of steel averages to weigh 490 pounds; a cubic foot of cast iron averages about 450 pounds. The volume of one pound of cast iron is 3.84 inches.

CAR WHEELS last about 23 months on the Second-avenue line, N. Y. They are all bought of Frank H. Andrew of New York.

SCIENTIFIC PROGRESS.

Chemical Action Between Solids.

One of the most interesting papers read before the Washington Philosophical Society last spring was that by Mr. William Hallock on the formation of alloys at lower temperatures than the melting points of either of their constituents. Mr. Spring, a distinguished chemist of Belgium, has been pursuing researches in the same field as Mr. Hallock, and has criticised some of the latter's work. At the last meeting of the Philosophical Society, Mr. Hallock turned the tables on Mr. Spring by examining some experiments, a description of which had been published, to prove that chemical action takes place between solids.

Mr. Hallock placed potassium and sodium in contact, arranging a thermometer to register the temperature. As they united, the temperature fell 2° 4 C. below that of the room. A block of ice and one of rock-salt, the temperature of each being reduced 10° or 12° C. below the melting point of the ice, when brought into contact began immediately the formation of the solution of salt.

One of Mr. Spring's experiments to show chemical action between solids consisted in placing copper filings and sulphur in contact. The sulphur attacked the copper. Mr. Hallock doubted that this was a case of chemical action between solids, and prepared the following described experiment to satisfy himself: A piece of bright copper and a small mass of sulphur were placed near, but not in contact with each other. After a time the face of the copper was blackened by the sulphur. Thinking it hardly possible that particles of copper might fly across the space between them, Mr. Hallock then varied the experiment as follows: The copper and sulphur were placed in a glass tube, with a wad of absorbent cotton an inch thick between them. The experiment was varied in several ways, in one case the tube being filled with dry air, in another the air exhausted, and in a third the tube being filled with oxygen, etc. In every case the copper was affected by the sulphur, although in some more than in others. Mr. Hallock's conclusion was that the chemical action did not take place between the copper and sulphur as a solid, but that the active agent was the vapor of sulphur. In the same manner reaction took place between copper and mercuric chloride, the vapor of the latter passing through absorbent cotton.

Mr. Hallock does not deny that chemical action may take place between solids—indeed, he is inclined to think that it does—but he holds that Mr. Spring's experiments do not prove it.

A REMARKABLE SPRING.—A company has recently purchased the Siltzer spring at Saratoga, near London, England, with a view to utilize its waters for the purpose of liberating and storing, in liquid form, the carbonic acid gas with which it abounds. In carrying out the arrangements, made under the supervision of Mr. Oscar Brunler, a German expert, a remarkable discovery has been made. This Siltzer spring was discovered by Dr. Haskins about three years ago, and a drill was put down to the depth of 500 feet. At this depth an abundant supply of water was found flowing from a crevice in the rock bottom. Recently, to assure himself of the depth of this spring, Mr. Brunler ended it with a line and plummet; but, instead of resting at 500 feet, the weight sank the whole length of the line, 900 feet. Other soundings have since been taken, the weight used being a piece of one-inch gas-pipe filled with lead, and weighing 34 pounds, until a depth of 3300 feet had been reached, and yet without touching bottom or any obstacle. No further soundings will be made until instruments specially designed for the purpose can be procured. Mr. Brunler admits it as possible that the line and weight may have been carried away by some powerful current, but he holds to his belief in the existence of a subterranean sea of greater or less extent, and of there being undoubtedly some connection between it and the water of the ocean. In other words, Saratoga is over a vast water-filled cavern, the roof of which is about 500 feet thick. Mr. Brunler also thinks it probable that at a given depth and temperature carbonic acid gas may be found in a liquid form. His discovery appears to dispose of the various theories and scientific speculations regarding the origin of the Saratoga springs.

HOW MAINSPRINGS OF WATCHES, LAMP CHIMNEYS, ETC., BREAK.—Writing on the breaking of watch mainsprings, Mr. W. B. Croft of Winchester College says: My neighbors, Messrs. Jacob & Rose, watchmakers, often tell me their experience in the breaking of mainsprings. Unreflecting people fancy they have broken the spring by over-winding, or, in other words, have drawn asunder a piece of steel by the force of finger and thumb. The springs, of course, break through a subtle molecular change produced in the steel by atmospheric causes; they usually fly asunder a few hours after being wound, at three or four o'clock in the morning. Many watches and clocks come to the workshops for new springs after a frost, but not until a thaw has set in; still more come after thunder-storms. A watchmaker speaks of a clock spring which had not been placed in any clock, but which on being taken out of the case was found to be broken into 17 pieces;

there was a complete fracture in each coil along a radial line from the center. The same person had previously found one with three such radial lines of fracture. Of course this subject is not new, but it gains by recorded experience. Glass vessels, particularly lamp chimneys and globes, frequently fly into pieces from no apparent cause, and in positions in which they have been remaining for weeks and months. The writer was once sitting at his desk writing, on a summer's day, when the bottom of a lamp chimney, which had been lying in a pigeon-hole for weeks, suddenly snapped and flew off, landing upon the floor several feet from the desk.

IMPROVED TELESCOPES.—When the object-glass for the Lick telescope was ordered its manufacture was considered an exceedingly difficult task on account of its large size—36 inches. The great Russian telescope at Pulkwa was the largest then in existence and measured only 30 inches. The addition of 6 inches to 30 was a very large increase in size, and the final success of the casting was reached at very great expense and only after a large number of failures. Now, however, it is said that Mr. Clark has contracted for a 40-inch lens for this observatory to be erected near Los Angeles, and he further claims that, in consequence of the improvements and late experience in glass casting, he will now be able to secure and prepare for mounting a lens 60 inches in diameter—one which will bring the moon within a few thousand feet of the earth. It is simply a question of time and money—mainly money, as a telescope with a six-foot lens, properly mounted, would cost \$1,000,000. If Mr. Clark's position is true, astronomy, a science which has been practically at a stand for years, will take giant strides. There will be practically no limit to the discoveries it can make, and there should come from it some practical benefits. Each year we will know more of the heavens, and of all sciences astronomy will be changed from the slowest to the most progressive. Of the world's refraction telescopes nine have apertures exceeding 20 inches, viz.: Lick Observatory, California, 36 inches; Pulkwa, Russia, 30; Yale College, 25; Littrow, Vienna, 27; University of Virginia, 26; Washington Naval Observatory, 26; Gateshead, England, 25; Princeton, N. J., 23; and Buckingham, London, England, 21. Six of these instruments are the work of an American firm.

PILE-DRIVING.—Scientific investigation shows that when a pile is struck on the top what is known as a wave of compression passes through it, and this wave requires time for its passage. Such a wave is set up in all columns when stress is suddenly brought on one end, as, for example, if the muzzles of a rowing piece containing a column of air is plugged up with a cork, or with snow or mud, the barrel may be burst when the weapon is fired, simply because, while the pressure at the muzzle is yet too small to move the cork, the pressure at the breech end is great enough to burst the barrel; or, in other words, the force of compression will not reach the muzzle until the breech has been burst. In the same way the detonation of a lump of dynamite on a rail will break it, the action being so sudden that the wave of transmission of pressure has not time to pass through the air surrounding dynamite, and the air really plays almost the same part as a block of steel round the explosive.

THE EARTH'S CLOUD BELTS.—We learn from the researches of M. Teisserenc de Bort that there is a marked tendency of the earth's cloudiness throughout the year to arrange itself in belts parallel to the equator. A belt of maximum cloudiness may be traced near the equator, two bands of light cloudiness extending from 15 to 35 degrees of latitude north and south, and two zones of greater cloudiness between 45 and 60 degrees, beyond which the sky seems to become clearer toward the poles. These zones have a noticeable tendency to follow the sun in its change of declination, moving northward in spring and southward in autumn. The zones of clear sky correspond with regions of high pressure. The distribution of cloudiness, according to M. de Bort, is a direct consequence of the course of the wind.

DANGER IN DUST.—Whoever thinks of dust as anything more than an inconvenience? Of what is dust made up? Think of this a moment, and its very complex and dangerous character will become apparent. Here are a few of the components of dust: Fine earth, fragments of wood, cotton, wool, feathers and almost everything under the sun. Dried excrement, spittle, filth from the gutter and every possible kind of offensive matter. Dr. Mackenzie, of London, has observed that there is much more sickness in dusty weather than at other times. Sore throats, catarrhs, colds, sore eyes and numerous other maladies abound during dusty weather. House dust is simply street dust brought indoors by the wind, or adhering to unclean boots and shoes.

A SIGNIFICANT FACT.—It is a significant achievement of science when a physician can be taken into consultation at a distance of 6000 miles. This was done recently by means of the telegraph and cable between Victoria, B. C., and London. The annihilation of time and space has rarely been more strikingly shown, and if the patient should recover the incident would deserve an honorable place in medical annals.

USEFUL INFORMATION.

Effect of Time on Slaked Lime.

Led by the statement that the keeping of the lime in a slaked condition for a couple of years is a great advantage to it, I took, says M. Faraday, specimens from the stores which have been so long laid up at the Houses of Parliament for the purpose of examining them in this respect. It appears to me that this lime (which is in a state of paste) is in a very soft and smooth condition in comparison with what would probably be the condition of the lime recently slaked, a condition which seems to be due to its thorough disintegration as a mass, and its separation, particle from particle. On analyzing it I found that it contained a little carbonic acid, but not much, for in 100 parts of the dry substance there were but 51 parts of carbonic acid; these 100 parts, therefore, would contain 88 parts of quick or uncarbonated lime and 12 parts of carbonated lime, which, considering the process of burning, carrying, slaking, etc., that it had to go through, and the necessary time of exposure to air before it was laid up in store, is a very small proportion. I do not believe that the lime which is more than four inches in from the exterior has received any portion of carbonic acid during the two years of its inhumation. In respect to the effect of keeping lime for a time, I am led to think, without, however, having formed any strong opinion on the subject, that the benefit is due to the fine texture that it gradually acquires, and as there is no doubt that if two surfaces were prepared, the one with fine sand and lime in particles comparatively coarse and the other with the same kind of sand and lime in particles comparatively far more perfectly divided, these two would act very differently both as to the access of carbonic acid from the atmosphere and the transition of lime dissolved in the moisture of the mass from the interior toward the surface, so there is reason to expect there would be a difference in the degree of action upon the colors at that surface, and also in the time at which that action would come to a close.

SILVERING IRON.—A manufacturer in Vienna employs the following process of silvering iron: He first covers the iron with mercury, and silver by the galvanic process. By heating to 300° C., the mercury evaporates and the silver layer is fixed. Ironware is first heated with diluted hydrochloric acid, and then dipped in a solution of nitrate of mercury, being at the same time in communication with the zinc pole of an electric battery, a piece of gas carbon or platinum being used as an anode for the other pole. The metal is soon covered with a layer of quicksilver, is then taken out and well washed and silvered in a silver solution. To save silver, the wire can be first covered with a layer of tin; one part of cream of tartar is dissolved in eight parts of boiling water, and one or more tin anodes are joined with the carbon pole of a Bunsen element. The zinc pole communicates with a well-cleaned piece of copper, and the battery is made to act till enough tin has deposited on the copper, when this is taken out and the ironware put in its place. The wire thus covered with tin chemically pure and silvered is much cheaper than any other silvered metals.

AN INGENUOUS RAILWAY APPLIANCE.—It will soon be just as safe to travel on a railroad train as to remain quietly and comfortably at home. It is a shrewd and inventive native of Australia who proposes to bring this longed-for blessing about. He has designed a truck which is to be run at any desired distance before every train. The motive-power is to be furnished by a dynamo placed upon the engine. If the truck should come into collision with anything on the track, certain glass tubes in which the electric current is conducted are broken, and at the same moment the brakes on the train are automatically applied and the cars brought to a quick standstill. Those who have seen the working model say the invention is a great success; but even if it be a failure it furnishes absolute evidence that the inventive geniuses of the world are now at work upon the problem of how to make high-speed travel absolutely secure.—*N. Y. Graphic.*

THE GAME OF MARBLES IN ENGLAND.—Marbles, which once boasted as many games as there are days in the year, are now fallen upon evil times. Knuckling down is clean forgotten—if the art continues, it is called by another name; the alley law is confounded with his brother of the rank and file; there are no longer sold the finer varieties in stone and glass, or in colored and streaky marble, nor do boys, like sportsmen, yearn for a full bag; nor do they study any longer the intricacies, the possibilities and the subtleties by which their bag may be filled. The game is now only played by little boys—their bag is small; their game is simple, and whenever they can raise a penny, the marbles become a vehicle for gambling.—*Saturday Review.*

THE MILITARY DRILL FOR LADIES.—The military drill has been introduced in the Middle Georgia Military and Agricultural College for the physical development of the female students. The young ladies have been formed into a company and are taught military movements. They recently marched to the Methodist church to attend the service, occupying

seats in one corner, while the young men, who also marched thither, occupied seats in the opposite corner.

TREE GROWTH.—George M. Woodruff of Litchfield, Conn., who carved his initials 35 years ago on the limb of an apple tree, found the souvenir the other day just as a piece of the tree was going into the fire. Mr. Woodruff has often looked for the initials "G. M. W.," but they had disappeared from the surface. A short time ago the tree was cut down, and the letters, as found, must have been about four inches from the surface.

CAMEL'S HAIR BELTING.—Recent experiments at the Royal Polytechnic School at Munich show that belting made of camel's hair has a strength of 6315 pounds per square inch, while that of ordinary belting will not stand a strain of 2230 to 5260. The camel's hair belt is said not to be affected by acids, and works exceedingly smooth and well.

DREDGING THE THAMES.—The tedious work of removing bowlders and the remnants of an ancient forest from the bed of the Thames river still goes on. It began seven years ago. At last accounts 300 trees and 1300 bowlders had been taken out. The latter varied in weight from one to four tons.

VEGETABLE GROWTH ON A TELEGRAPH WIRE. A telegraph wire is the last thing one would expect to support vegetation, yet a traveler in Brazil writes to a German horticultural journal describing a crop of mistletoe which he found clothing the wires not far from Rio Janeiro.

ETCHING MIXTURE.—A mixture that will etch deeply or give a beautiful frosted appearance to metal is prepared in the following manner: Sulphate of copper, one ounce; alum, one-fourth ounce; powdered salt, half a teaspoonful; vinegar, one gill; nitric acid, 20 drops.

SUNFLOWERS are used in Wyoming Territory for fuel. The stalks, when dry, are as hard as maple-wood, and make a hot fire, and the seed-heads with the seed in are said to burn hotter than the best hard coal. An acre of sunflowers will furnish fuel for one stove for a year.

A BABEL OF LANGUAGES.—The Bible has to be printed in 29 different languages to supply the people living in Pennsylvania. The largely varied industries of Pennsylvania attract to that State a much more cosmopolitan population than any other State in the Union.

ABOUT 30,000 cords of hickwood has been manufactured into spools at Foxcroft, Me., the past few years.

GOOD HEALTH.

The True Cause of Baldness.

How it May be Avoided.

The habit of wearing warm coverings on the head is not of recent date; the armies of Europe, for instance, no inconsiderable number of men, with heads close cropped, have worn for a long period warmer and heavier head-gear than the modern dwellers in cities, without the same tendency to baldness. Nor are the heavy fur coverings of northern races incompatible with luxuriant hair. It is also difficult to understand what injury can result from close cutting, *per se*. The growth is in the hair-follicle, and in it alone; there is no vital connection between the hair outside the scalp and within; it is usually cut closest at the back of the head and neck where baldness never occurs. Would not close cutting rather stimulate the growth by exposure of the scalp? Such at least is the popular belief. So, too, with indoor life; women, who ought to show it most, whether in the home or in the factory, are never bald as men are; on the contrary, it is most common with men in good circumstances, men who spend a larger proportion of their daytime in the open air than the indoor worker.

I believe the common form of baldness is due entirely to the kind of hat that is worn, principally to the high hat and the hard felt hat, but also to any other head-covering that constricts the blood-vessels which nourish the hair bulbs. To have a clearer understanding of this, we must remember that the scalp is supplied with blood by arteries at the back, sides, and front of, and lying close to the skull, which diminish in size by frequent branching as they converge toward the top of the head. They are in a most favorable position to be compressed, lying on unyielding bone and covered by thin tissue. Consider what effect must be produced by a close-fitting, heavy, and rigid hat; its pressure must lessen to a certain extent the flow of arterial blood, and obstruct to a greater extent the return of the venous; the result being a sluggish circulation in the capillaries around the hair follicles and bulbs, a consequent impairment of nutrition and final atrophy. This pressure is not trivial or imaginary, as any one will admit who has noticed the red band of congestion on the forehead when a hard hat is removed after moderate exercise.—*W. C. Gouin-lock.*

PUBLIC HEALTH—NATIONAL LEGISLATION.—An important bill was introduced into the Senate at Washington on the 4th instant by Senator Gibson for the establishment in the Interior Department of a bureau of health, to be

under the direction of a commissioner, who shall receive an annual salary of \$5000. The bill also provides for the appointment by the President of a health commission, to be composed of 20 members, who shall be divided into six sections, as follows: Five for the yellow-fever section, and three each for the cholera, typhoid fever, scarlet fever, smallpox and diphtheria sections. Each member shall receive an annual salary of \$1200, and it shall be their duty to investigate the cause, origin and best mode of prevention of the diseases mentioned. Five members of the commission shall be organized into a quarantine commission, whose duty it shall be to examine into and report on the efficiency of quarantines at the various seaports of the United States. Upon the report of the commission to the Health Commissioner, if the quarantine service at any point is ineffectual, the commissioner is commanded to direct the Collector of Customs at the port to refuse entry to any vessel, goods or persons coming from any infected place unless the vessel shall have undergone quarantine at some national quarantine station. The Health Commissioner is directed whenever called on by a Governor of a State to make rules and regulations and take measures for the suppression of any infectious disease. It is made the duty of the consular office to make weekly reports to the Health Commissioner in regard to the sanitary condition of foreign ports. It is made unlawful for any person to obstruct commerce between the States or with any foreign country except in accordance with the rules prescribed by the Health Commissioner.

NURSING OUR ACHES AND PAINS.—Some who are always sick seldom think that they have it in their own power to do for themselves that which no other one can do for them, but are always presenting their cases to all who meet them, with comments and suggestions, until their auditors are weary. Daily and almost hourly these feelings are talked over without the least alleviation, until both sick and well become discouraged as to any favorable result. If such would only become acquainted with the principles of mental hygiene, and act accordingly, how much suffering to self and friends might be saved. Human nature is generally prone to extremes, and by these conditions diseases of various kinds and grades are induced, and with impatience to regain health and still retain old habits, physicians and friends are expected to contribute to the demands of the patient while they themselves act as an independent party. No greater mistake could be made. There must be co-operation of both patient and attendants to insure success. Patients who constantly worry about themselves and study every ache and pain, very seldom make rapid recovery.

WHY WOMEN SWIM WELL.—Their precious bones are lighter and their flesh is more buoyant. The records of the humane societies on both sides of the Atlantic show that of late years a fair proportion of their medals fall to the lot of girls. There were several notable instances of rescue from drowning last summer by girls under 20 years of age. Many women are accomplished swimmers. This is not natural. As their bones are generally lighter than those of men, and their flesh more buoyant, they have less difficulty to overcome in acquiring the art. Some of them could float at their first attempt if they could acquire the requisite faith in the power of the water to hold them up. Swimming is very much an act of faith, for it is generally the case that when a person believes sufficiently in the buoyancy of the water to trust it to his precious body, lo! he is a swimmer. There were young girls at Newport last summer who could float on the surface of the ocean with no more difficulty than they experienced in lying upon a sofa. They could have floated for hours if necessary. Some of the most famous swimming feats have been accomplished by very young women.—*Philadelphia Record.*

EFFECT OF CLIMATE AND CHANCE OF LOCATION ON LONGEVITY.—The Philadelphia Medical News prints an important address delivered before the American Climatological Association at its late meeting, by Dr. Loomis of New York City, dealing with the novel question of the climate and environments best suited to people who have passed the prime of life. The author shows that old age thrives best in moderately warm climates, and that a change of residence once or twice a year is a necessity, while the locality selected must invite an outdoor life, with surroundings which stimulate to mental and physical activity. He emphasizes the importance for persons of advanced age of an abundance and variety of simple, nutritious and well-cooked food, the avoidance of the exhaustive business habits and excitement of earlier life, and the utility of warm alkaline baths.

INTERESTING STATISTICS.—According to the following statistics, France must be peculiarly blessed with a healthy climate. The number of persons in each 1000 between the ages of 50 and 60 are: France, 5373; Holland, 4984; Sweden, 4954; Great Britain, 4722; United States, 4398. The highest average ages of the living are: France, 31.06; Holland, 27.76; Sweden, 27.66; Great Britain, 26.05; United States, 23.04. Out of every 100 deaths those persons over 60 are: France, 36; Switzerland, 34; England, 30; Belgium, 26; Prussia, 19; Austria, 17. France has the lowest birth rate, which is 23.8 to 1000, Great Britain 31, Germany 38.

Technical Training in Public Schools.

On Thursday, Nov. 23, a paper was read before the Polytechnic Section of the American Institute "On the Value of Technical Training and the Teaching of Drawing and Handwork in Public Schools," by Edward Combes, C. E. C. M. G., Officer of the Legion of Honor and president of the Board of Technical Education of New South Wales.

The following is an abstract of the paper: The subject has occupied the attention of great statesmen and eminent educationalists. Nearly every Government in the civilized world has instituted inquiries concerning it. All of these resulted in recommending the organization of a system of technical education. The old system of apprenticeship having broken down, it becomes the duty of the State to devise other means of teaching the various handicrafts.

Drawing the foundation of all technical teaching, and should be taught in every primary school. Its importance in an industrial education. The study of drawing directly valuable as an educating and humanizing influence, training the mind to be observant, judicious and active. Drawing connects the culture of good taste with culture in morals, especially developing industry, order, decency and purity.

Description of Herr Jessen's method of teaching drawing, the distinguishing figure being individual personal instruction, as opposed to the ordinary system of teaching in class. Great success of his method and general adoption.

The question as to the best method of teaching in technical schools. Importance daily becoming more significant. Public opinion more and more prevalent that radical modifications must be made in primary schools.

The impossibility of making all our young men parsons and clerks, consequently something should be taught adapted to the manufacturing requirements of the country.

Manual training or handwork should be compulsorily taught in every primary school. Children must be taught to use their hands as well as their heads.

The Swedish system of teaching handwork called the *slöjd*. Its success. Normal school for teachers of the system, instituted and endowed by Herr Ahramson.

Opportunities and facilities for the acquisition of technical knowledge greater in France than in any other part of the civilized world.

Political aspect. Cost of technical education repaid to the State by the extra quantity and quality of the work.

MT. RAYMOND MINING DISTRICT.—At this district in Fresno county the Star Mining and Reduction Company are pushing work on their concentrating plant as fast as men and means can do it. They have purchased one of A. S. Hallidie's elevated wire ropeways to carry their ore from the mine to the mill, a distance of 1½ miles, which is now almost erected. They will have their whole reduction plant in operation about December 15th, when they will commence the shipment of concentrates at the rate of 25 tons per day. The concentrates will net \$100 per ton in gold, silver and lead. There are no other companies operating in the same district as yet, as the ores are hard and require expensive plants for profitable treatment.

SACCHARINE seems now to be extensively used as a substitute for sugar in syrups and preserves, and even in champagne. This last is a fact fully recognized in commerce. Even as a medicine, saccharine is not harmless. M. Worms says that diabetic patients who use it for a fortnight lose their appetites. M. Dujardin Beaumetz thinks, however, that as a therapeutic agent saccharine is useful in the case of the few diabetics who cannot do without sugar. The *Gazette des Sciences Medicales* thinks there can be no doubt as to the propriety of preventing its general use.

TOO MUCH WATER.—The famous Perahacker mine, Magalia, shut down the other day on account of a rush of water into the tunnel. An improved engine was at work keeping the water out, when the flume that supplied the engine with water fell some distance above the mine. This caused the engine to stop, and the engineer hastened to fix up the flume. But when he returned the pump in the tunnel were covered, and we are told that new pumps and many thousand dollars extra expense will be required to put the mine in the condition reached when the flume fell.—*Oroville Mercury.*

MELROSE, an outgrowth of Alameda on the east, is rapidly coming into prominence as a manufacturing center. Within its boundaries are Whittier, Fuller & Co.'s smelting works, now running night and day and turning out on an average 300 tons of white lead a month; the new fuse works, which are also running full blast, and also the factory of bisulphide, a poison for the extermination of squirrels. Machinery for the manufacture of mineral paint is now being placed in position, and this industry will be in operation before the end of the year.

A FULL-GROWN hawk and two does have been feeding for some weeks with the cattle of Albert Rosa at Long Valley, Lassen county. Mr. Ross does not disturb them, and he hopes the graceful animals will stay and get tamed.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

COAL NOTES.—Livermore *Herald*, Dec. 7: Work has been begun in the Pen Daren incline. Thirteen shifts of miners are sinking, and will sink to a depth of 500 feet. At the Richards vein the company will sink a double-compartment shaft at once, and will work both the Eureka and Richards vein through this shaft, prospecting so far done assuring an immense deposit of good coal. The present incline will then be used for an air-shaft. It is the intention of the company to open its mines as they should be opened, and they have ample means to do so, and they are spending their money so as to be able to ship 250 tons of coal a day, within four or six months from date, by which time the Livermore Valley Railroad Co. will have their road to the mine completed. The mine is in charge of Jenkin Richards, one of the most experienced coal miners on the coast, he having particular knowledge of this field, having nearly done all the prospecting in this locality.

Amador.

PACIFIC.—*Dispatch*, Dec. 8: At 1 A. M. Thursday week, one of the large water-tanks used in hoisting water at this mine caught in a piece of broken tract and damaged the tank to such an extent that it cannot longer be used. A wooden bucket has been provided in its stead, and they are now hoisting night and day with the tank and bucket. It is expected that the mine will be dry about the middle of February.

CASCO NO. 2.—The assessment work is being done on this mine, located between the old Hardenberg and the Truckee Lumber Co.'s claim in Hunt's gulch. A tunnel is being run into the hill south, on the ledge, and the indications are flattering for a good mine.

CUPPS' MINE.—Operations on this property, located about half a mile east of the New London, have ceased. No cause is given for the shut-down. The superintendent, Mr. John Cupps, is in S. F., and writes that the suspension of work is only temporary.

COSMOPOLITAN.—At this mine, near Drytown, they are in with their crosscut about 70 feet to the east, and have cut through several nice stringers of quartz. They expect to strike the main ledge soon.

NORTH CALIFORNIA.—A three-foot ledge of good milling ore has been struck in the west crosscut of this mine, about 80 feet below the surface.

PLYMOUTH.—*Amador Ledger*, Dec. 8: The Plymouth Consolidated is running two shifts in taking out water, and work of drainage is making satisfactory headway. In another month at the outside, the works ought to be free of water.

NORTH STAR.—They are running alongside the rich seam and have advanced the drift over 50 feet, the seam continuing the whole distance. They are not taking it out, although occasionally breaking into it, proving that it still holds out. It is probable that the shaft will be put down another 100 feet, and from that depth a drift will be run to tap this seam, as the general impression is that at the present depth they have simply encountered the apex of an ore-chimney, and that it will be found to widen out at a greater depth.

Butte.

GOLD BRICK.—*Oroville Mercury*, Dec. 7: Superintendent Gregory of the Cherokee mine was down to-day and shipped a \$62,000 gold brick, having made a cleanup of \$68,000, the result of a three months' run. The mine is nearly out of debt locally, and a few more cleanups like this one will put it on a solid basis. The payroll is about \$11,000 a month and it is the best paying institution in Butte county.

FORRESTOWN.—*Oroville Register*, Dec. 7: Three quartz ledges are being worked and employment given to about 100 men in getting out ore and running the mills. The chlorination works are now completed and are quite successful in their reduction of the ore. They are among the largest works of this character on the coast. There are a number of late developments in quartz that promise very rich.

Calaveras.

RESUMING.—*Mountain Echo*, Dec. 5: All the mines throughout the county that have been closed down during the summer for lack of water are resuming operations.

LINDSAY.—Work is progressing steadily in the Lindsay mine near this town.

Fresno.

WHITE CROSS.—*Fresno Examiner*, Dec. 7: The White Cross mine near Dunlap, owned by the Works boys, is yielding some very rich gold-bearing quartz. None of the ore has been assayed lately, as it is free-bearing rock and the gold can be seen all through it with the naked eye, and when anything better than that is wanted they "born-noon" a sample or two. A tunnel 170 feet in length is being run on the ledge, and the rock is being piled up on the dump for future working.

Humboldt.

BEACH MINING.—*Humboldt Times*, Dec. 7: The gold concentrator, which we mentioned some time ago on the south beach, was taken to Coos Bay, and lately returned to this county. It is now at work on the gold-bearing sand on the property of C. E. Beach near the mouth of Little River.

Mariposa.

WINNER.—*Gazette*, Dec. 8: The shaft on the Winner, near the cemetery, is 85 feet deep. Very good prospects have been obtained, and a contract has been let to run a drift along the lode, 100 feet in each direction. Twelve men are at work on the Pine Tree mine. At the depth of 600 feet, where they are now operating, they have uncovered about 200 feet of a vein which averages good assays and has the appearance of permanence. The vein is about six feet in width. They are storing the rock for milling.

HORNITOS.—*Mariposa News*, Dec. 1: J. B. Brown struck a rich pocket this week at the Duncan mine. It is reported that he took out over \$1000.

RED CLOUD.—Red Cloud mine expects to resume work again shortly.

LEAO AND SILVER.—*Sonoma Bayner*, Dec. 7:

Mr. Louis Blanding has just tested a piece of iron ore from a mine in Mariposa county, owned by Mr. R. B. Randall, and finds 57½ per cent of lead and \$257.20 in silver.

Napa.

QUICKSILVER SHIPMENTS.—*Calistogan*, Dec. 5: During the month of November the following amount of quicksilver from the mines mentioned was shipped from Calistoga: Napa Consolidated, 475 flasks; Sulphur Bank, 256; Bradford's, 218; Great Western, 28; total for month, 977 flasks.

Nevada.

SOLD.—*Grass Valley Union*, Dec. 7: It is rumored that a controlling interest in the old Gold Hill mine has been sold. A vein of fine ore has been opened up in the North Banner mine above the level of the lower drain tunnel. It is three feet in size. The vein in the winze 30 feet below the floor of the tunnel is showing of equal size. There is now a force of 25 men employed at the mine. The new mill is about ready to start up, the only occasion for delay being to have all the machinery in smooth working order to commence regular crushing. All the machinery of the mine and mill works will be run by water-power. The work on the new mill of the Pittsburg mine is being pushed as fast as possible to get ahead of winter weather. If the storms keep off the works will be inclosed in the next two weeks, when the placing of the machinery can proceed without interruption. A force of workmen is now engaged in putting the surface plant of the Coe mine in condition to start the underground work. About two weeks' time will be required to place everything in order.

PUTTING IN THE FRUE.—*Grass Valley Union*, Dec. 9: Mr. James Brownell, representing the firm of Adams & Carter of San Francisco, has been busily engaged putting in four Frue concentrators at the North Star mill, these concentrators to do the work from the additional ten stamps being placed in the mill. The North Star is well stocked with the Triumph concentrators, but they are going to give the Frue a thorough test.

Placer.

THE HIDDEN TREASURE.—*Placer Herald*, Dec. 7: This mine still continues to yield handsome dividends to its fortunate owners. The tunnel is now about 8000 feet in length, and on a uniform grade of 70 feet to the mile. Sometimes the grade carries the tunnel several feet into the bedrock and sometimes along its surface. The work is still done on the eastern side. Gangways are run off every 200 feet, and these are connected at the back end by crosscuts. The blocks thus formed have an area of 20,000 square feet. These gangways and crosscuts give a good circulation to the mine. The bedrock at the upper end of the tunnel is principally black slate which glistens like coal in the candle-light. Now and then this black slate is displaced by white. Occasionally a petrified tree trunk is found in the white quartz gravel. In addition to the improvements that were made in the tunnel last year the company put in nearly 1400 feet of sluices. These sluices are paved with wooden blocks, boulders and broken car wheels. The latter make splendid riffles. At the end of the first set of sluices is an under-current, 36 feet in length by 12 in width. This under-current is so made that it can be raised or lowered according to the head of water. This is a new feature and works very satisfactorily. Some 150 men are employed in the mine. The work goes on night and day, and every carload of gravel is prospected before it is rolled out of the tunnel. The getting out of lagging and timbers employs quite a number of men. E. Woodridge has charge of this work under contract. The mine is worked systematically, and is under the efficient management of Harold T. Power. Quite a town has grown up around the mine, on the El Dorado Canyon slope.

AT OPHIR.—*Placer Argus*, Dec. 7: Work is progressing at the Hathway mine at Ophir. Four men are at work cleaning out the tunnel, and six men are busy on the mill. They have erected a mill 36x64 and the hoisting works 20x40. The quartz will be raised by two friction drums on an eccentric shaft, the power to be furnished by a four-foot six-inch Knight wheel. The mill is a ten-stamp Knight and will be run by a six-foot Pelton wheel. The rock-crusher will be run by a 24-inch Pelton. Iron pipes will be laid from the reservoir and will give a fall of 230 feet in a straight line. Everything will be ready to start about Jan. 1st. There is considerable good rock in sight, and extra precaution will be taken to save all the gold, as there are 110 square feet of copper plates, almost as much as is usually used on a 20-stamp mill.

DARDANELLES.—*Placer Herald*, Dec. 7: Work in the Dardanelles has been delayed by water. Some underground reservoir has been tapped and has discharged a 20-inch stream for the last ten days. Some of the men have been laid off temporarily until the water is got under control, as there is not room for them all to work. The mill has not been run steadily for the reason that there has not been a sufficient quantity of gravel taken out, since the water trouble began, to feed it. The gravel is as rich as ever.

FOREST HILL.—J. C. Scott of Forest Hill made the *Herald* a social call this week. Mr. Scott owns in several claims in the vicinity of Forest Hill, and has been cleaning out and retimbering the tunnel on his Volcano Canyon claim. This tunnel is 625 feet in length. Mr. Scott has started an upraise about 600 feet back from the mouth of the tunnel, but has stopped work for a time on account of bad air.

San Diego.

THE OIL WELL.—*San Diego Sun*, Dec. 3: Boring for oil in Sweetwater valley was resumed this morning, a week later than had been intended by the soliciting committee who raised the money. It is believed that but a few hundred feet farther than the depth of 700 feet already attained will uncover the cheap fuel supply that experts say underlies the soil.

Shasta.

NOTES.—*Shasta Democrat*, Dec. 5: Tom Cummings, the old resident, we are told, is on the head of the McCloud river prospecting for silver. Five stamps on the Frank Wheeler mill at French gulch started up last week, and with more rain the mill and mine will be worked with full force. The Calumet M. Co.'s mill is now running night and day. They are piling up sulphurets by the ton, which they expect to work on the ground as soon as their furnaces are ready. There are about 20 applications for patents on quartz mines in this county

now going through the usual legal formula through the Shasta land office. This is in itself a good showing for the mining interests of this county. The Gladstone M. Co. of French gulch is putting in one of the Paul 12-stamp batteries. They will use water for power, and seeing the completeness of the Knight wheel at the Calumet mill, have ordered a duplicate of it for their mine. The Gladstone is one of the big mines of Shasta county and is owned by Thos. Cummings, Charles Osborne and John Morrell. O. P. Woodward of Whiskeytown believes a rich mining camp will be developed on Whiskey creek before many winters pass by. He is an old resident of Whiskeytown and knows the country surrounding that old placer camp thoroughly. The hidden sources that feed the rich placer grounds in that region can be found by close and diligent prospecting, and some good prospecting will be done there this winter. John Border & Son are developing a fine prospect on Whiskey creek, about a mile east of Whiskeytown, that promises to be a good mine. The vein is about three feet wide, well defined, and the ore they are now taking out is high grade. In close proximity George Knox has struck a rich chute of ore in the old Emigrant mine. The chute is between 50 and 100 feet long, and is cut at a depth of about 100 feet. George thinks the ore he has taken out lately will average \$50 to the ton. He is fixing up an arastra, which he will start up as soon as sufficient water-power can be obtained.

SOLO.—*Courier*, Dec. 8: John Winters, who has been one of the main men in charge of the batteries at Lost Confidence mine, Iron Mountain, for some time, has sold a mine on the Mountain, between the Lost Confidence and the daisy Little Nellie mine, to Isadore Krauss for a consideration said to be \$4000.

POCKET.—Knox, Crocker & Gerry have struck what has the appearance of a pocket bonanza near Rock creek, two miles or so north of town—a six-inch ledge of chrome and quartz conglomerate between porphyry walls smooth as polished marble.

Sierra.

THE RAINBOW.—*Tribune*, Dec. 7: At the Rainbow mine, Chips Flat, work is to be resumed in the tunnel as soon as enough water comes to run the machinery. The tunnel is in 2000 feet on a newly discovered ledge.

Siskiyou.

PLACERS.—*Yreka Journal*, Dec. 8: The Breceda Bros. are opening a placer claim at the mouth of Deadwood creek, in preparation for the rainy season, and expect to do well as soon as plenty of water is furnished during the winter storms. On the South Fork of Scott river the miners on the various tributaries are expecting to put in some good work at mining until the snow gets too deep or the storms too heavy to confine their operations to cabin life. The river miners on the Klamath still continue to take out pay gravel, but expect to be obliged to suspend most any time now, when a heavy storm or heavy frost occurs.

Trinity.

LONG RIDGE.—*Trinity Journal*, Dec. 8: Mr. Crowl brought in some specimens of coal from Poison Camp. A vein 10 feet thick is exposed in a washout. Poison Camp is in this county, about 12 miles from Hettenshaw. Coal has also been found on Bluff creek, about seven miles from Poison Camp. These discoveries will undoubtedly incite a more thorough prospecting of that neighborhood.

COX BAR.—C. J. Johnson of Cox Bar says that the miners in his vicinity are ready for their winter's work. He says that the prospects of the Vance Bar mine, of which he is owner, are very encouraging. While in town he made arrangements for more pipe and material to work the mine on a larger scale another season.

NEVADA.

Washos District.

HALE AND NORCROSS.—*Virginia Enterprise*, Dec. 7: During the past week 934 tons of ore have been hoisted and 767 tons have been sent to the Mexican mill. The average battery assays have been \$30.25 per ton. On the 500 level are stopping ore of good quality from the body recently discovered in the main west drift. On the 600 level have started a drift west to find the downward extension of the 500 level ore body. The stopes on this level continue to show considerable fair-grade ore. On account of the scarcity of water in the Carson river, the Mexican mill has been unable to work the full shipments of ore. The bullion on hand amounts to \$12,000.

SAVAGE.—On the 400 level the southeast drift has been advanced 25 feet in porphyry and clay. The northeast drift was advanced 24 feet. The face is in quartz which gives low assays. During the week have hoisted 597 tons of ore and have shipped to the Rock Point 490 tons, the average battery assays of which are \$18.01 per ton. Have shipped bullion amounting to \$940.67, and have bullion at the mill amounting to \$10,479.23.

CONFIDENCE.—The top of the raise from the 1200 still shows ore of good milling grade. During the past week 500 tons of ore assaying \$32.75 a ton have been shipped to the Brunswick mill, Carson river. Have shipped 8 bars of bullion valued at \$22,962.47, being the closing shipment on November account. The total bullion production during that month was valued, by assay, at \$105,689.51.

CON. CAL. VIRGINIA.—The stopes on the 1400 level are yielding the usual amount of good ore. On the 1600 level some ore is being extracted from above the track floor. On the 1650, ore of good quality is being mined at half a dozen different points and a good deal of prospecting is being done. The usual amount of ore is being shipped to the river mills.

YELLOW JACKET.—Running prospecting drifts throughout the mine. The men at work extracting gold ore were laid off on the 28th of November pending the result of a test run of the ore by a concentration process at the Santiago mill. Supt. Sharon went to the Bay night before last, and the result of the test would be known to him yesterday.

CHOLLAR.—The raise from the north drift on the 650 level continues in low-grade quartz. The west drifts on the 750 and 850 levels are still in clay and quartz. The Nevada mill is running 30 stamps (by water-power) on ore from the mine.

CROWN POINT.—The raise from No. 1 crosscut on the 700 level is passing through ore of an excel-

lent quality. Good progress is being made in cutting the drain and grading the Suro tunnel drift. There remain now about 250 feet to finish. Repairs to boilers and to the incline engine-room and boiler-room are about completed.

JUSTICE.—Are still engaged in repairing the north drift. The Alta Co. has commenced a raise to connect with the 490 level north drift and are up 32 feet. Are still stopping milling ore from the south-east winze. The cannon-ball crushers in the mill will be replaced by 10 stamps.

ALPHA.—The 500 level north lateral drift is north of the shaft 192 feet; the face is in clay and quartz. The south lateral drift on the same level is in south of the shaft 95 feet; the face is still in quartz that assays from \$12 to \$20 per ton.

BELCHER.—Good headway is making in the north drift on the 200 level. It is in a favorable mixture of clay and quartz. The joint (Seg. Belcher) drift on the 1100 level is in quartz carrying some metal.

BEST AND BELCHER.—The north drift, 20 feet west of the winze, has been extended 13 feet; total length, 30 feet; formation, porphyry, clay and quartz, showing some value.

GOULD AND CURRY.—On the 200 level the north drift started 100 feet from the top of the upraise has been extended 30 feet; total length, 76 feet; formation, hard porphyry.

CHALLENGE CON.—During the past week 220 tons of ore have been extracted and sent to the Brunswick mill. The average assay of this ore is \$32.95 a ton.

ANDES.—Have repaired stations No. 1 and No. 3, and are now repairing station No. 2. Are doing the usual work on the 350 and 240 levels.

SCORPION.—On the 300 level the west crosscut has been advanced 15 feet during the week; the total length is 315 feet.

UNION CON. AND MEXICAN.—The joint north-east drift has penetrated Mexican ground 198 feet.

SIERRA NEVADA.—The two crosscuts on the 520 level are in a mixture of quartz and porphyry.

SEG. BELCHER.—The joint Belcher drift on the 1100 level is in quartz carrying some metal.

OPHIR.—The south drift on the 1465 level is in porphyry, showing numerous seams of clay.

CON. IMPERIAL.—The repair work on the 1100 level is still in progress.

POTOSI.—The 650 level south drift is still showing clay and porphyry.

ALTA.—Good progress is making in the changes to the mill.

BULLION.—Hoisting works again running.

Tuscarora District.

DIANA.—*Times-Review*, Dec. 7: The crosscut being run east on the 300-foot level has been advanced 12 feet.

NEVADA QUEEN.—No. 2 east crosscut from west gangway, 200-foot level, has been advanced 14 feet. Line crosscut on 225-foot level of Commonwealth has been extended east 6 feet, and west 8 feet; the rock continues hard. On the 100-foot level Commonwealth, the joint crosscut is showing six inches of very high-grade ore. No. 1 winze, from 350-foot level station, has been cut out and timbered, and started sinking. Bottom is in ore, 14 inches of which is good grade. North drift, 450-foot level, has been extended 10 feet, encountering more water and much softer rock. Work at the concentrator is being pushed; expect to have all running in a day or two.

NAVAJO.—150-foot level: The upraise on the west vein, opposite the shaft, has been extended upward 12 feet, and has materially improved, looking well in the top. Crosscut from same vein has been extended 8 feet. 350-foot level: Crosscut from west vein has been extended 18 feet. South drift from No. 4 crosscut has been advanced 13 feet. The stopes are yielding a full supply of high-grade ore for the mill. Mill is running nicely and doing good work—shipped Monday, December 3d, \$16,978.16.

COMMONWEALTH.—100-foot level: No. 1 winze from east lateral has been sunk 11 feet, and connection made with east lateral on 150-foot level. North drift from joint west crosscut has been extended 10 feet, and intersected with east crosscut. Intermediate drift from top of No. 4 chute has been extended 10 feet in vein material, showing some good ore.

GRAND PRIZE.—The 400-foot level station is now clear of water, and the work of laying track, etc., will be begun immediately. The 300-foot level winze station is being fixed, and sinking will be resumed to-morrow.

COMBINATION SHAFT.—Work on the new hoist is progressing favorably. The building is inclosed, and machinery being put in place as fast as possible.

FOUND TREASURE.—The surface cuts have been completed. The timbers in east drift, 200-foot level, have been eased, and the drift put in good order.

NORTH BELLE ISLE.—West crosscut, 400-foot level, has been advanced 14 feet. Rock continues about the same as last reported.

BELLE ISLE.—East crosscut from north drift has been extended 7½ feet; the rock continues very hard.

Eureka District.

THE DIAMOND TUNNEL.—*Sentinel*, Dec. 7: The contractor in the new Diamond tunnel has completed the grading for the blacksmith shop, and two days ago was about entering the mountain with the face of the tunnel proper. He has received about all of his winter supplies, and in a few more days will be under cover. He has a crew of six of the best miners to be found in the district and will push the work day and night until it is completed. A blast in the face of the tunnel on Thursday disclosed a two-inch stringer of fair-looking galena ore. This is not important except as an indication that the limestone belt at that point is strongly mineralized all the way down to the shale contact. The tunnel starts in on the upper edge of the shale, a little of it showing on the lower side of the cut of the tunnel. It is the opinion of judges that the new tunnel is quite apt to cut important feeders to the main ore body within a distance of 150 feet. The small stringer met within the face on Thursday last adds strength to this opinion.

Flowsy District.

TRIBUTERS.—*Virginia Enterprise*, Dec. 7: In Flowsy district tributaries are obtaining small lots of

good ore from the North Bonanza, Lady Bryan and half a dozen other mines. The Bossell mill is running on sulphurets from blanket slices. W. Rowe, the present owner of the mill, has fitted up the dwelling adjacent and will make it his home for the future. A good milling head of water is now roaring and dashing and splashing down through the rocky channel of the canyon.

Philadelphia District.

PURCHASED.—Belmont *Courier*, Dec. 8. J. E. Severance is the owner of all the mining property, including the hoisting works, machinery, etc., situated in Philadelphia Mining District, formerly owned by the Belmont Mining Company. Mr. Severance also owns a half interest in the Monitor Belmont mill, the last payment having been made last week. Lessee J. E. Severance shipped this week 11,418 ounces of silver bullion (in ten bars) 900 fine. The Monitor Belmont mill is running constantly on ore from the Barcelona mine. This mine continues to yield rich ore in good quantities.

ARIZONA.

CLIFTON.—*Clarion*, Dec. 7: We have often been asked of late our opinion as to the mining future of Clifton. To this we can only give our humble opinion that as a copper camp it is bound to be a howling success for years to come. As a producer of the precious metals, time and development can only answer. This much, however, we can with truth say: That while there may be as good, there are certainly no better indications in the Territory of the wealth and permanency of ledges than are found in this neighborhood; and we do not know of any section which can show so many. It must be remembered that it is only within the past year that attention has been called to this district as a producer of gold and silver, and it has made a most excellent showing in that time. No real depth has been attained so far to test the permanency of ledges, but of those on which work has been done none have yet "petered out." The future of Clifton is certainly very bright from the present standpoint.

WATERVILLE.—*Tombstone Epitaph*, Dec. 7: But very little has been done on this property since last week. Aside from the fact that the machinery was delayed in transit, the rains have left the roads almost impassable, so that the completion of the works are set back about 30 days.

GROUND HOG.—H. T. Fisher, superintendent of the Ground Hog and Vizina mines, returned from the East this week, where he purchased a diamond drill, and will start prospecting the Vizina. Mr. Fisher also completed arrangements for the erection of a ten-stamp mill, and work will be commenced in a few days. The mill will be erected near Tombstone.

LUCKY CUSS.—Work on the 400 north is being pushed ahead as fast as possible to connect with the 300 winze. The south drift on the 300 is in over 300 feet. The winze between this level and 400 yields fine ore.

EMERALD.—The Rand drills are at present at work on the south drift on the 300, but one will be placed on the 400 in a few days.

HURSCHEL.—The drift is in 81 feet all in good ore. The winze is down 18 feet. Stopping has been commenced and shipments will be made regularly.

BRITISH COLUMBIA.

ORE SHIPMENT.—*Donald Truth*, Dec. 5: This week 50 tons of ore were shipped from the Monarch mine at Field to the smelter at Vancouver. The ore carries about \$25 to the ton in silver and a large percentage of lead. The value of the lead and silver combined will approximate \$5000. From this on the Monarch will make regular ore shipments. The company is building a shed over the upper tramway so as to prevent a stoppage of work on account of snow. Some 30 men are employed altogether, and work is carried on in the mine by a night and a day shift.

JUBILEE MOUNTAIN DISTRICT.—Charles F. Law, who has been absent in Ontario for some time trying to raise money to develop the Law & McIntyre claims on Jubilee mountain, has succeeded. He has raised \$8000, which is to be expended on development work during 1889. As soon as the necessary papers are signed, work will be commenced and prosecuted vigorously on the Atlanta claim. Jones & Wells on their side of the mountain have built a good wagon-road from their claims to the steamboat landing, a distance of six miles, and will at once put eight men to work taking out ore from their great Spilmichene mine. The ore will be taken from the croppings, which are over 125 feet in width, and hauled to the landing for shipment when navigation opens in the spring. This mine will undoubtedly prove one of the big ones of British Columbia. It is an immense ledge of low-grade galena, that carries \$12 in silver and from a trace to \$3 in gold to the ton.

COLORADO.

COAL.—*Elk Mountain Pilot*, Dec. 6: The coal trade from Crested Butte is gradually on the increase. All of the new coal cars the Rio Grande has built within the last year have been 20-ton cars instead of the regular 10-ton narrow-gauge cars, so while the number of cars may not have materially increased the tonnage has practically doubled. The C. & I. Co. have orders for all of their coke output, but for some reason the mine does not run on regular full time for coal shipments. The anthracite mine and breaker is now running regular and expects to do so all winter notwithstanding rumors to the contrary. Supt. Haas informs us that they have experienced some difficulty in getting good men to go to work there or stay when they could get a job elsewhere, owing to the report being circulated that the mine is going to shut down soon for the winter, which is absolutely false, and so far as known now the mine will run all winter without stopping. They have orders on hand for over 6000 tons of coal and orders coming in about as fast as they can produce the coal.

NOTES.—*Georgetown Courier*, Dec. 7: The Little Giant is said to be turning out well. Sinking is still under way on the lode cut by the Florence tunnel. Two cars of Stevens ore were milled at the Miners' Works last Saturday. Fillius & Co. have shut down the Stevens concentrating works for the winter. The miners on the Freeland are making a

vigorous kick against working seven days a week. The Hall tunnel is going ahead about five feet a day. During the month of November 58 cars of ore, containing 690 tons, were shipped from Georgetown. Denver received 40 and Argo 18. Between four and five tons of ore from the Commonwealth were milled last Saturday that returned 68 ozs, silver per ton and 61 per cent lead. The purchaser of the Orient leased and bonded the mine a couple of months ago and took out enough ore to pay for it. There's tenderfoot luck for you. Works are to be built in Denver to utilize the asphaltum found on the dividing line between Colorado and Utah, where it is said to be found in almost unlimited quantity. The shaft on the Blatter lode has been sunk 50 feet, and the bottom shows an immense vein of quartz. In 20 shifts, the time that the Florence tunnel was worked in November, the heading, 8x9 feet, was driven a distance of 82 feet, or over four feet a shift through granite and gneiss. This is splendid tunnel work and shows what our skilled miners, backed by ample power, can do. The tunnel is in 350 feet.

IDAHO.

SHEEP MOUNTAIN.—*Idaho Statesman*, Dec. 2: Geo. B. Baldwin says that he left four men at work on his mines at Sheep Mountain, who will continue all winter on three claims in which he is interested, namely: White Goat, Junbo and Birdie R. George says that he shipped five tons of ore from the White Goat the past season that went 260 ounces silver and 25 per cent lead per ton. He thinks he will be able to ship over 100 tons of similar ore from the same mine next season. Mr. Baldwin is interested in nine mining claims in this district. He is of the opinion that the Sheep Mountain country in a few years will be the best mining section in Idaho. The natural outlet is the Wood River valley, and an effort should be made by the commissioners of Alturas county to assist in building a road to that prosperous camp.

ORO FINO.—*Avalanche*, Dec. 6: The new Oro Fino mill has closed down for a few days, for the purpose of repairing and putting in new batteries. It will probably start up again soon.

NEW MEXICO.

BULLARD'S PEAK.—*Southwest Sentinel*, Dec. 4: Another important strike is reported on the Alhambra mine, owned by Miller & Dodd. The ore is almost pure native silver, and there is a considerable quantity of it.

SANTA RITA.—Mr. George D. Roberts and Wm. A. Farish were here several days for the purpose of examining the Santa Rita copper mines. It is reported these gentlemen are endeavoring to induce the French copper syndicate to purchase these mines.

PIÑOS ALTOS.—The Pacific M. Co. has not yet determined upon a location for their reduction works. They will build a 40-stamp mill and such other works as may be necessary to reduce the ores of their mines at Piños Altos. The Aztec Co. has leased the Bremen mill and will convert it into a gold-mill. Preparations have been made to be in running order by Jan. 1st. The consummation of the sale of the Atlantic mine to the Deep Down M. Co. is an assured fact.

GOLD HILL.—The success of the past year which has attended the efforts of the miners of this district is bearing its fruit in the inquiries now being made concerning the mineral resources of this particular region. The developments have been prosecuted under many disadvantages, yet the result of the year's labor has been very encouraging, and the indications for the future, in substance, may be summed up, viz.: The investment of capital, the building of mills, and a home market for the various ores of the district. During the year the abandonment of claims has been exceptionally rare, and those who have "pinned their faith" to this famous camp of the southern portion of the county have been rewarded a hundred-fold.

UTAH.

REVIEW.—*Salt Lake Tribune*, Dec. 7: Eleven months of 1888 have closed, with the bullion product, as per current reports, excluding all ores and not embracing some operations which make but annual reports, as follows:

January.....	\$ 327,141 43
February.....	255,637 79
March.....	283,263 98
April.....	234,019 30
May.....	385,735 14
June.....	333,890 42
July.....	199,083 26
August.....	169,975 46
September.....	312,511 48
October.....	290,521 59
November.....	303,589 30
Total.....	\$3,245,031 86

It is evident that the product of the year will be considerably short of the output of 1887. The receipts in this city for the week ending Dec. 5th, inclusive, were to the aggregate value of \$156,181.51, of which \$83,990.86 was ore and \$72,190.65 was bullion. For the previous week the receipts of bullion were \$155,277.20, and of ore, \$82,203.15, a total of \$237,480.35. The Ontario product for the week was \$13,428.58 of ore sold, and 37 bars of bullion, 21,807.55 fine ounces, an approximate total of \$35,236.13. The Ontario's November product was of bullion 90,540.58 fine ounces; ore sales, \$79,674.92; a total, approximately, of \$170,215.50. The Daily output for the week was \$11,031.29 from ore sales; no bullion. November output of the Daly, \$19,192.75 in ore, and of bullion 70,515.75 fine ounces, an approximate total of \$89,768.51. The Horn Silver is still dormant. It is reported that a new management will take hold on January 1st, no doubt under the auspices of the new directorate chosen at the October meeting. No report of the operations of the mine, if indeed there are any operations there, is obtainable. Fine bar receipts in this city for the week were to the value of \$39,220.42; base bullion, \$884.34. The Hanauer smelter bullion product for the week was \$18,350; the Germania's, \$5745.89. Ore receipts in this city for the week were to the value of \$31,518.67 by Wells, Fargo & Co., besides \$350 in sulphides; \$44,750 by McCormick & Co., including \$8050 Crescent; and \$7372.10 by T. R. Jones & Co.

TINTIC.—*Mining Times*, Dec. 7: Oreshipments from Tintic are crowding the capacity of the Salt

Lake & Western to such an extent that the company has found it necessary to run a Sunday train, an experience new in the history of the line. It is said by those who have an abiding faith in the future of the camp that the present tonnage will be doubled by this time next year.

LEAD.—The week past has witnessed considerable activity in the lead market. Taking the total sales, it is said that upward of 5000 tons have changed hands, and it is believed that this large quantity has gone to bona-fide consumers. The trading observed during the past few weeks has been quite astonishing, and clearly proves that consumers have been working without any stocks, and simply buying what they absolutely needed for immediate use. The white lead manufacturers have been especially conspicuous as buyers, and the smelting companies having come into the market with large offers, a large business has resulted. These heavy purchases taking place at the approach of the darkest season of the year, clearly proves that the trade has confidence in present quotations, and to all appearances it does not seem likely that prices will decline much further, as any slight drop would doubtless bring out more large buying orders. In Europe, consumption also continues on a satisfactory scale.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Dec. 13, 1888.

As usual at this season of the year general trade is inactive. Judging from the tenor of advices the year just drawing to a close has been fairly prosperous, while the outlook for the coming year is favorable to an improvement over that of 1888. This is particularly the case with foundrymen and iron-workers in general. It is asserted with confidence that more mining machinery and other iron work will be required than for several years past. The favorable weather for crops and a heavy deposit of snow, which will supply mining districts with water, are important factors in promoting the confidential feeling which pervades the commercial community. In the local market money is reported to be quite easy, more so than in December, 1887, with a conviction in financial circles that after the turn of the year the ease will be still more marked. The banks report a light call for funds, with deposits showing a gradual increase. The demand for funds to remit to the East is light, while for home purposes the inquiry is limited. For speculative purposes the call for accommodations is growing less as the year draws to a close. There was some inquiry for wheat purposes, but it appears to have about died out, while from dealers and brokers in mining stocks there is very little call for accommodations. The general tenor of advices from those in position to know is confirmatory that a large proportion of outside holders of mining stocks have been sellers, and as strong moneyed parties bought, no funds are wanted to carry their purchases, which aids very materially in giving an easy money market. It now looks as if those who have bought are preparing for a bull movement in the near future to peddle out their holdings at a higher range of values preparatory to another line of assessments. From the Comstock mines all information received is favorable for an upward move. The development in Best and Belcher is of a most promising character, but it will take time to get it in working order so as to take out ore. Con. Virginia is looking exceedingly well on all the levels, while the work going on in the Ophir, Mexican and adjoining mines promises good results within the coming year. In Hale and Norcross and Savage, ore of good value is being taken out and crushed. The Chollar and Potosi mines are getting into better position for taking out more ore when the Nevada mill starts up, which will be soon. The work in Crown Point and Belcher is being watched with great interest so as to demonstrate the richness and extent of the development made in them several months ago, and which by the outside public is forgotten. It is reported that the ore in Confidence and Challenge is grading higher. In Alpha, Con. Imperial and Bullion, exploration work of a favorable character is going on. From the Tuscarora, Bodie and Quipota districts the tenor of advices is of a favorable character. In the latter district it is stated that more extension work is likely to be inaugurated in the Indian Chief group of mines, which experts report to be rich in gold.

MONEY CIRCULATION OF THE UNITED STATES.

	Dec. 1, 1887.	Jan. 1, 1888.	Dec. 1, 1888.
Gold coin.....	\$396,450,216	\$396,361,148	\$391,304,086
Standard dol's.....	64,827,714	64,377,318	60,625,356
Subsidy silver.....	51,751,182	51,908,387	52,014,197
Gold certificates.....	90,780,758	96,794,057	129,264,228
Silver certificates.....	163,149,274	176,855,423	237,415,789
U. S. notes.....	330,282,796	331,260,591	311,478,660
Nat'l b'k notes.....	206,751,181	203,479,444	233,061,711
Totals.....	\$1,368,878,016	\$1,384,032,533	\$1,406,150,456

SILVER.—The market has ruled firm the past week at the lower quotations given in our last issue. The available supply of silver bullion is small. Some say that the holdings are not pressed on the market, owing to a general belief that a higher range of values will obtain after the turn of the year. The latest sale reported in this city was 92½c, although only 92½c was bid. The output of the mines on this coast is not as large as it was claimed that it would be at the close of the year; doubtless much of this is due to many of the mines being worked for stock manipulation purposes.

London cables quote silver to-day at 42½d. New York telegrams quote silver at 93c. Our market closed at 93c.

QUICKSILVER.—The demand holds up well, both home and shipping. A confidential feeling is expressed that the consumption on this coast the coming year will be all of 25 per cent more than it was in the year drawing to a close. The large deposits of snow in the mountain ranges insure a liberal water supply for working the mines, while many new ones are being developed that will call for considerable quicksilver. The price continues nominally unchanged.

LEAD.—The market, as usual, in December is dull, but the tone appears to be firm in sympathy with the East. Advices from New York report the sales to consumers of 7000 tons in the central markets the latter part of last month.

IRON.—The market is very firm for both spot and

to arrive, but business is at a standstill, and will likely be until after the turn of the year. The strength of the market is due to the strong and high markets abroad, and the home production being under contract. It is claimed that the consumption in 1889 will show a decided increase over 1888.

TIN.—The market for both pig and plate is in buyers' favor at irregular prices. The demand is slow, with large consumers out of the market, except at a lower range of values.

COPPER.—The market is heavy, with very little trading reported. Prices are reported to be tending in buyers' favor. The high prices ruling are promoting active work in several copper mining districts on this coast.

COAL.—House coal is weak under free offerings of coast. Steam coal continues firm under moderate supplies. English coal for shipment and to arrive is strong, but Australian for shipment is in buyers' favor. For May-June delivery, Australian is said to be purchasable below \$9 a ton.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Dec. 13, 1888.—The following are the closing prices the past week:

	Silver In	Silver In		
	London.	New York.	Copper.	Lead.
Thursday.....	42½	92½	\$17 30	\$3 70
Friday.....	42½	92½	17 40	3 45
Saturday.....	42½	92 7-16	17 25	3 50
Sunday.....	42½	92 7-16	17 35	3 50
Tuesday.....	42½	92½	17 40	3 50
Wednesday.....	42½	92 11-16	17 40	3 75

Borax is in moderate demand, but steady. Sales were made at 8½¢ (29½¢); refined, 8¢ (8½¢). Quick-silver was quoted at 60¢ (62¢), but not in a large way. Refined Petroleum—Barrels, \$1.25; plain cases, \$9.25. It is reported that a syndicate has engaged 20,000,000 pounds Lake copper to large consumers for January, February and March at 16½¢, and outside at 17½¢. Pig lead is quiet; workers are well supplied; nominally at 33¢.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' values. All prompt delivery. Australian Tin, —@—; Biliton Tin, \$24.50@—; Banca Tin, \$24.25@24.50; Baltimore Copper, \$15.00@15.50; Orford Copper, \$16.00@16.25; P. S. C. Copper, —@—; Foreign Lead, \$4.75@5.00; Foreign Spelter, \$6.00@6.25; Antimony, \$10.00@13.50.

TIN.—London quotations have been more than usually influential in determining the course of prices here, except that our futures have been relatively firmer than spot; while in the foreign market the reverse has been the case. Only 30 tons have changed hands all week, although prices have not been absolutely stagnant.

COPPER.—Shows no real improvement in condition of trade, although 50,000 lbs. have been sold in the Exchange, which is the best week's record for November, this having been the dulllest month of the year; in strong contrast with November, 1887, when trading ran up to nearly 20,000,000 lbs.

LEAD.—Gets more and more stagnant weekly, exhibiting this time a record absolutely blank of sales.

SPELTER.—Was nominally steady until toward the end, when a decline of 5 to 10 points was made, closing weak at the lowest point, and has throughout been quiet.

PIG IRON.—The market is very firm on desirable brands. Corawall irons are held at an advance of about a dollar per ton, as the furnaces are sold so far ahead that prices are firm for new business at \$16, \$16.50 and \$17 at furnace for the three grades.

San Francisco Metal Market.

WHOLESALE. THURSDAY, Dec. 13, 1888.

ANTIMONY—French Star.....	13½@ 14½
BORAX—Refined.....	7½@ 7½
Powder.....	7½@ 7½
Concentrated.....	6½@ 7½
COPPER.....	
Bolt.....	26 @ 27
Sheeting.....	26 @ 27
Iron—Glenbrook ton.....	16 90 @ 19 00
Fire Box Sheets.....	— @ 26
Eglington, ton.....	— @ —
American Safe, No. 1, ton.....	— @ 50
Oregon Pig, ton.....	— @ 50
Clay Lane White.....	— @ 24 50
Shotts, No. 1.....	— @ 29 00
Bar Iron (best) 30 lb.....	2½ @ —
Chrome Iron ore, ½ ton.....	8 00 @ 10 00
LEAD—Fig.....	5 @ —
Bar.....	11 @ —
Sheet.....	5 @ —
Pick and Hammer.....	4 @ 5
Shot, discount 10¢ on 500 bags Drop, ½ bag.....	1 55 @ —
Buck, ½ bag.....	1 75 @ —
Chilled, do.....	1 95 @ —
SPELTER—English, lb.....	10 @ —
Crown tool.....	9 @ —
Black Diamond tool.....	10 @ 16
Pick and Hammer.....	8 @ 10
Machinery.....	4 @ 5
Toe Calk.....	4 @ —
TRIPLE—Oke, prompt shipment.....	4 55 @ 4 90
Coke on spot.....	— @ 15
Charcoal, 14x20.....	6 75 @ 7 25
do roofing, 14x20.....	5 50 @ 5 62
Fig 40, 3 lb.....	23½ @ —
QUICKSILVER—By the flask.....	— @ 42 50
Flasks, new.....	1 05 @ —
Flasks, old.....	— @ —
CORR—English, ton.....	20 00 @ —

PRICES OF COAL "TO ARRIVE."

	Per Ton	Per Ton
Australian.....	\$10 00 @ 11 00	Cardiff..... 10 50 @ 11 10
Liverpool S'm.....	11 00 @ 11 50	Lehigh Lump..... 20 00 @ —
West Hartley.....	11 50 @ 12 50	Cumberland blk 18 00 @ 15 50
Scotch Splint.....	11 00 @ 12 00	Egg, hard..... 16 50 @ 17 00

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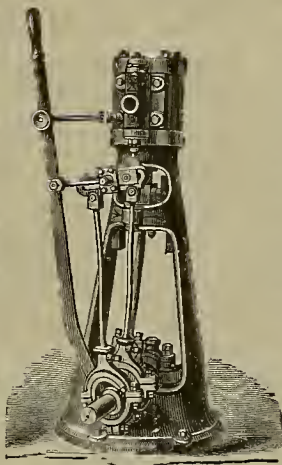
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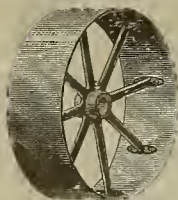
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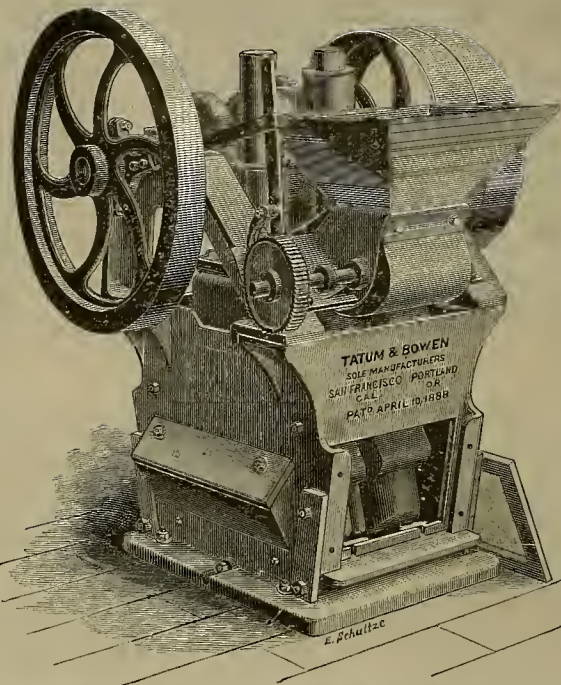
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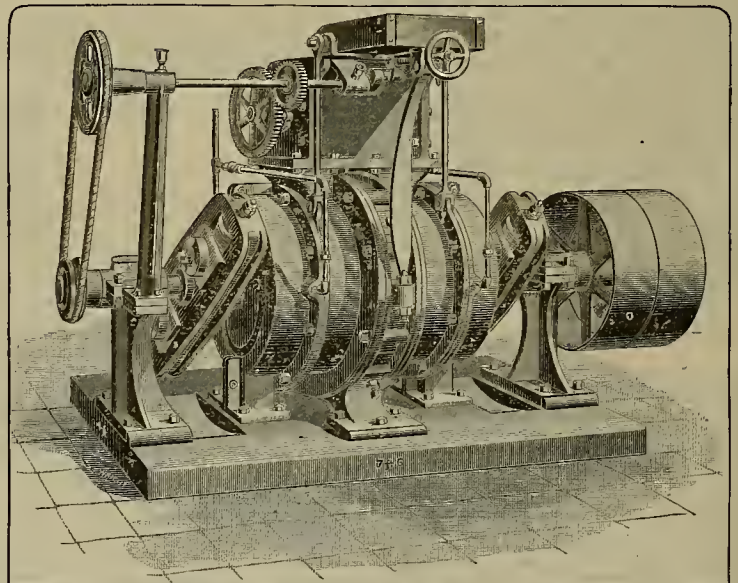
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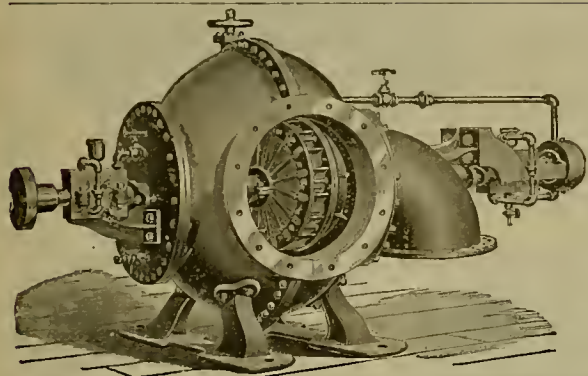
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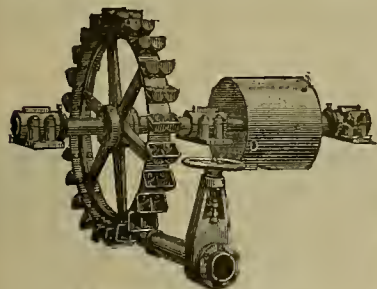
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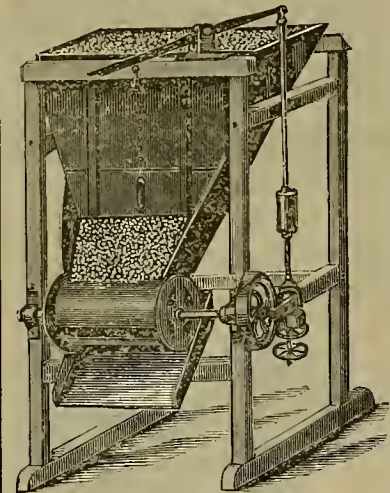
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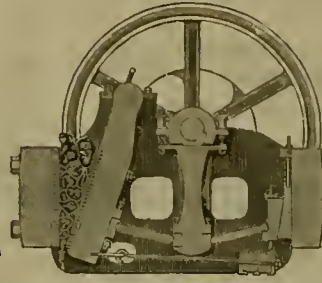
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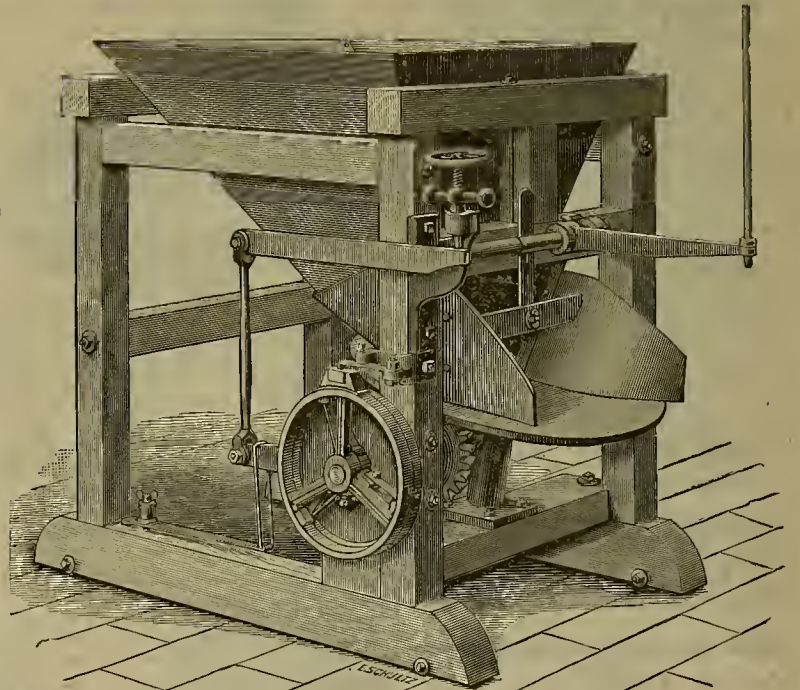
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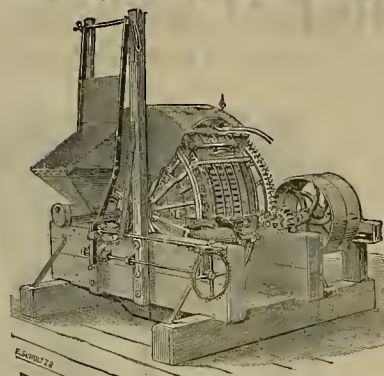
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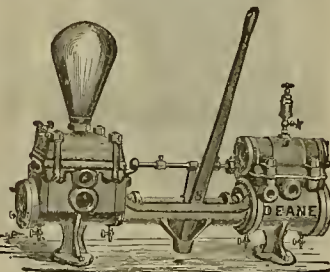
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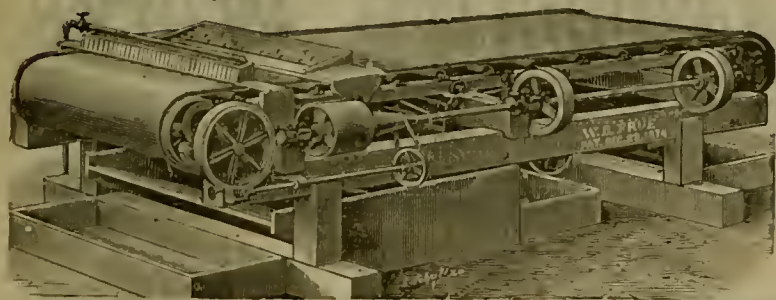
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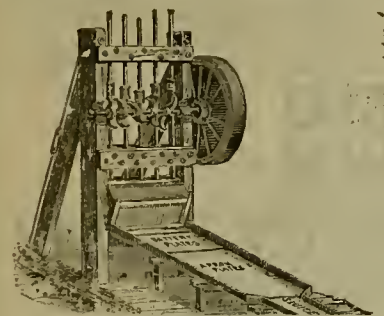
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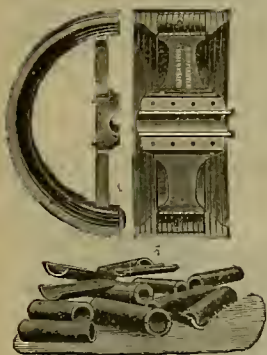
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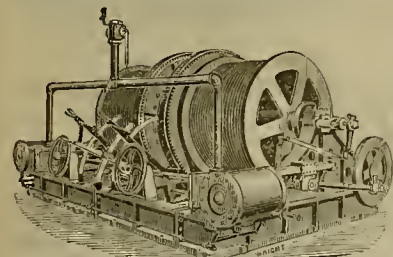
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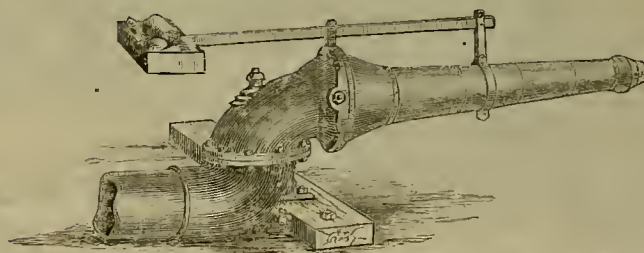
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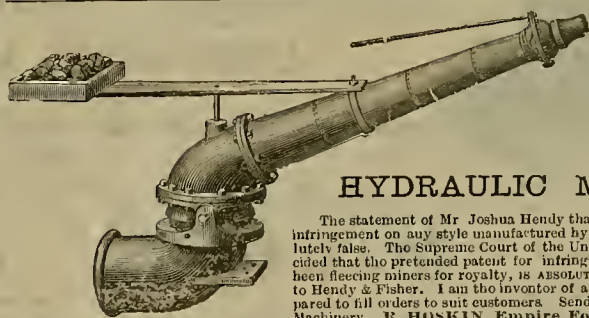


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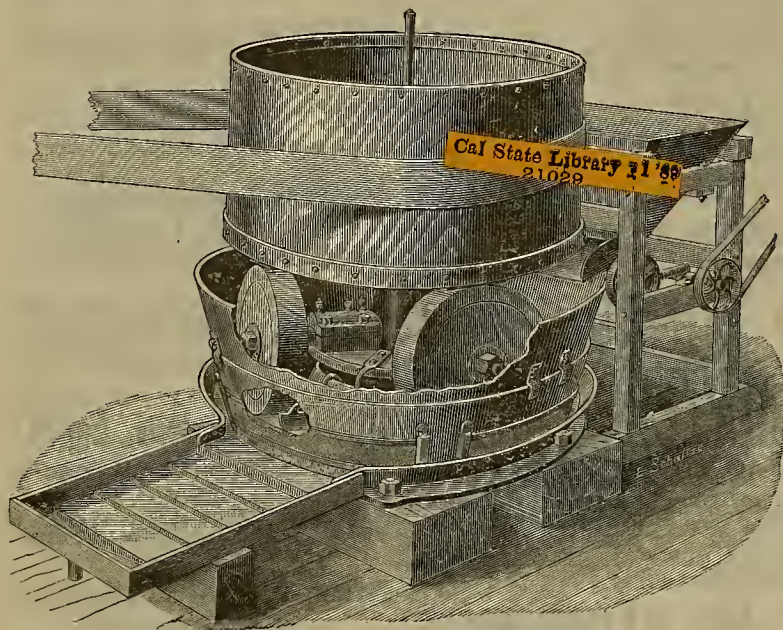
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I have crushed in that time probably not less than 10,000 tons of this material, without any repair being necessary, and without any change of shoes and dies, and, as far as I can judge, they appear to be good for as much more service.

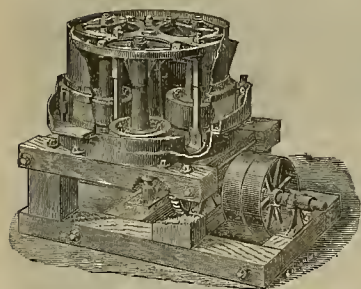
I have had more or less experience with nearly every crusher in the market, and regard the Gates as infinitely superior to them all. In fact its efficiency, durability, and capacity for work is simply wonderful. For crushing all kinds of ore, ballast or macadam—fine or coarse—nothing can compare with it. You are at liberty to refer any parties to me who may want further evidence as to the merits of this remarkable machine. Very truly yours,

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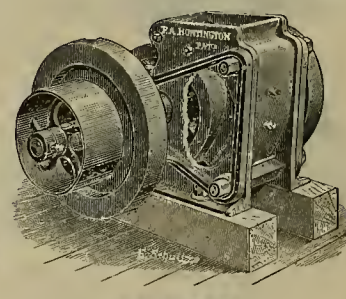
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.
Publishers.

SAN FRANCISCO, SATURDAY, DECEMBER 22, 1888.

VOLUME LVI
Number 25.

Cheaper Coal.

Our manufacturers as well as domestic users have always had to pay higher for coal in this city than should be the case, and for a year or more past there has been much complaint on all sides, prices being advanced beyond all reason. The result has been that coal from Wyoming and Colorado has been brought into the market by rail. This the coast colliery people are desirous of preventing. It was thought coal would be high again this winter, but it has dropped instead of advancing. Perhaps the mildness of the season has something to do with it. At all events, prices are weakening, greatly

Money in Circulation.

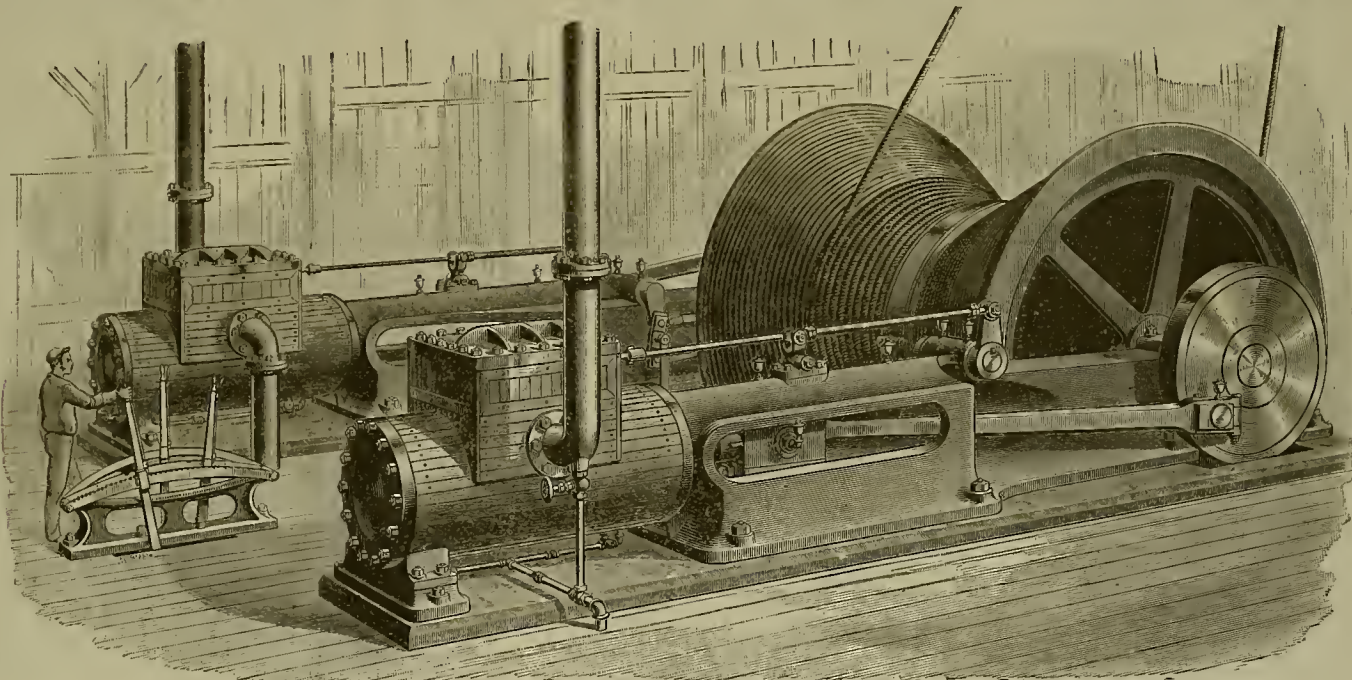
In last week's MINING AND SCIENTIFIC PRESS was published a tabulated statement issued by the Treasury Department, showing the amount of money in the hands of the people of the United States on December 1, 1887, January 1, 1888, and December 1, 1888, which affords an opportunity for a comparison with the currency conditions prevailing a year ago. The first of this month the entire circulation of the country was \$38,277,340 greater than on December 1, 1887. Within the 12 months the gold certificates increased from \$90,780,753 to \$129,264,228, and the silver certificates from \$168,-

like month 1887, on January 1, 1889, the money circulation of the country ought to show a gain of about \$40,000,000 during the year.

AN ELECTRIC-POWER FAILURE.—We noted some time since the fact that the Big Bend Tunnel Co., Butte county, had put in a large electric-power plant, with which to do pumping and other work in the river-bed when laid bare by the water being turned through the tunnel. The electric-power was to have been utilized during the past season, but after many attempts to make it work satisfactorily, without success, the scheme has been given up. The whole plant, dynamos, motors, wire, etc., has been

Mine Hoists.

Hoists for mining purposes may be divided into two classes, viz., single and double hoists. Of these there are again two types—first and second motion engines. In the former, two engines with cranks at right angles to each other are coupled direct to the drum shaft; in the latter the engine carries a pinion, meshing with a spur-wheel keyed to the drum shaft. The rope drums in either case are proportioned in diameter to the size of rope employed, and in length, to depth of shaft. In single shafts but one drum, of course, is necessary, but double-shaft hoisting engines are provided



DOUBLE-SHAFT FIRST-MOTION HOISTING PLANT WITH TWO FUSEE DRUMS.

to the delight of consumers. With Wellington \$4 per ton lower, Coos Bay down to \$7, Seattle, Cedar River and Diamond a dollar lower, at \$10 to dealers, Rocky Mountain grades \$3 per ton off, and sales of Australian steam grades at a loss of \$1.50 to \$1.75 per ton to importers, there is hope of getting cheap coal. A new coal called the Cherry Valley has come into the market. The mines produce about 500 tons per day, and can produce 1000 tons readily when required. The other coast collieries are pushing production. There is considerable coal on the way from Australia, but arrivals of late have been light. High prices have stimulated production and it is thought coal will go a good deal lower before it again advances in price.

SAN FRANCISCO MECHANICS have sent a delegation to the Mayor urging him not to veto the franchise of the Omnibus R. R. Co., recently granted by the supervisors, as the company would have all its iron work done in San Francisco. Mr. Sutro says it will cost \$60,000 to \$70,000 more to have the iron work done at home, but the company has decided to get it done here nevertheless.

THERE are 500 men at Globe, Arizona, working in the copper mines, which are now very profitable.

149,274 to \$231,415,789. The United States notes within the like time shrunk from \$330,362,796 to \$311,478,660, and the National bank notes from \$266,751,131 to \$233,061,711. Of coin in circulation, gold has fallen from \$396,450,216 to \$381,391,086; standard silver dollars from \$64,627,714 to \$60,625,355, while subsidiary silver coin increased from \$51,751,132 to \$52,914,197.

The conversion of large denominations of money into smaller ones has been so rapid that the circulation in coin and notes of \$20 and smaller forms have probably been expanded by nearly twice the amount by which the aggregate has been increased. On December 1, 1887, the aggregate money in circulation was \$1,368,873,016; on January 1, 1888, it was \$1,384,032,833, and on December 1, 1888, \$1,406,150,456. During the month of December, 1887, the circulation increased a little over \$15,000,000, but on and after January, 1888, the circulation steadily declined for several months, or until a demand came in from the Central and Southern States for crop purposes, when an expansion set in and gained in volume until on December 1, 1888, it aggregated over \$22,000,000 more than on December 1, 1887. Taking this as a basis, and if the increase in this month is proportionately larger than was the increase in the

taken out and will be shipped from the mine for sale. The electricians were unable to accomplish the results they had expected. Whether the failure was due to the system adopted or to faulty construction we are not informed, but the fact remains that the plan has been abandoned.

W. C. WILCOX, the inventor of the Wilcox deep-well pump, died at Napa last Saturday. Mr. Wilcox will be remembered by mechanics here as having established, with Mr. Baker, the Wilcox Pump Works, in the same building where the Dow steam pump is now made. He made a very vigorous attempt to displace the Hooker steam pump with his own invention, but did not accomplish his purpose. Mr. Wilcox was quite an inventor and obtained a number of patents on his devices.

ABOUT 2000 new specimens are now being classified and arranged for the museum of the Mining Bureau. One of the choicest lately received is a large nugget from a pocket in the Bonanza mine near Sonora.

THE United States Supreme Court decides that a life-insurance policy is not a part of the estate of an insolvent debtor, and cannot be claimed by his creditors.

with two rope drums, each having a separate rope. The cut on this page shows the general arrangement of a double-shaft, first-motion hoisting plant fitted with two fusee drums. We take the cut from a paper by F. O. Roberts on "Wire Rope Hoistings," read before the American Institute of Mining Engineers.

THE Riverside Press says that another rich silver mine has been discovered within the limits of San Bernardino county. An assay demonstrate that ore which was hardly deemed worth working assays \$454.95 to the ton, and the lucky San Bernardino gentlemen who own it have sent men and teams to open up and work it.

No more lumber rafts will come from Canada. The explanation is that a Canadian law has been passed at the instance of owners of sailing vessels, placing the duty on lumber exported in rafts equivalent to a small margin for profit on the raft system.

THE Rock Springs Miner says: For the month of November the shipments of coal to the Anaconda smelter in Montana amounted, with freight, to the enormous sum of \$103,000. This is only one account with the coal department.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Lixiviation of Silver Ores.

NUMBER 3.

EDITORS PRESS:—In a recent article I suggested that SO_2 , in presence of aqueous polysulphide, might produce H_2S ; on trial I find that it does so. Hence, Mr. Stetefeldt's hypothesis $2\text{Na}_2\text{S}_2 + 3\text{SO}_2 = 2\text{Na}_2\text{S}_2\text{O}_3 + 3\text{S}$ is incorrect; it seems more likely that $\text{Na}_2\text{S}_2 + \text{H}_2\text{SO}_3 = \text{Na}_2\text{S}_2\text{O}_3 + \text{H}_2\text{S}$, which would, as already suggested, round out Mr. Stetefeldt's theory of precipitation very neatly. Unfortunately that theory is untenable for two reasons: Firstly, because sodium sulphate is not formed, as I have just proved once more, and secondly, because no thiosulphate is ultimately lost, as I have also just proved with both weak and strong solutions of polysulphide. I have made some experiments with a view to testing the correctness of my theory of precipitation; the results tend to verify that theory, but are not quite conclusive. In fact, I suspect the reaction is complex, and varying according to conditions.

In view of the fact which I have observed, I must retract my remark that hydrogen sulphide "would not even be produced by acid sulphites," though of course it would not be given off in presence of a metal solution.

The fact that SO_2 causes evolution of H_2S from a solution of polysulphide affords an indication of sufficiency in neutralizing a caustic polysulphide by means of SO_2 .

The two facts that SO_2 and CO_2 decompose a polysulphide in solution, forming H_2S , seem to favor the view that, in presence of water, the hydrogen acids are formed thus: $\text{SO}_2 + \text{H}_2\text{O} = \text{H}_2\text{SO}_3$ and $\text{CO}_2 + \text{H}_2\text{O} = \text{H}_2\text{CO}_3$, as has been enpossed by some chemists.

As bearing on the question of this reaction in the precipitation of silver in the leaching process, I will state that I have made a set of experiments which prove conclusively that, in the precipitation of silver from a hypo solution, neither sulphurous acid nor sulphites are produced, which again shows the incorrectness of Mr. Stetefeldt's theory.

A strictly neutral solution of silver in sodium hypo was treated with a limited quantity of strong solution of sodium polysulphide, free from caustic soda and filtered. The filtrate remained neutral, and a portion of it warmed in a test tube did not give off acid vapors, as shown by a piece of moistened litmus paper within the tube. The experiment was repeated with weak sodium polysulphide and with calcium polysulphide with the same result. Portions of the liquids tested for sulphites by sodium nitroprusside gave negative results.

It is now the fashion to precipitate any lead which may be present in the lixivium separately from the silver and copper. In the Russell process this is done by means of sodium carbonate. In the presence of calcium salts, sodium carbonate will precipitate calcium carbonate along with the lead, hence it is totally inapplicable to the Kiss process and is disadvantageous in the Patera process when the ore contains gypsum which dissolves in the hypo.

Sodium bicarbonate does not precipitate calcium from the leaching solution in the absence of lead, but when lead is present with a calcium salt the precipitate is much contaminated by calcium carbonate. Sodium (or potassium) sulphite precipitates lead completely from its solution in hypo; the lead sulphite settles fairly well, and is a valuable product, having been used as a pigment. The sulphites, like the bicarbonates, do not precipitate calcium (unless added in great excess) in the absence of lead; yet, in the presence of calcium salts, the lead sulphite carries down calcium sulphite, so that it is not applicable to the Kiss process nor to the Patera in presence of calcium. Lead may be precipitated from its solution in calcium hypo containing also silver and copper by means of solution of either chromate or bichromate of an alkali or of calcium. The precipitate is obtained free from calcium, silver and copper, and consists of lead chromate which is a valuable pigment; this method of precipitating lead is equally applicable to the Kiss and the Patera process, the only, or at least the chief, defect being that the precipitate does not settle rapidly in the cold liquid; it might do better if heated.

In the Kiss process the separation of lead may be effected by means of milk of lime, the lead being thrown down as hydroxide. With very pure and newly slaked lime the method may answer fairly, but otherwise it cannot but yield a very impure product; it must be executed with care not to use an excess of lime, or the hypo will become caustic, as calcium hypo readily dissolves a portion of calcium hydrate. An excess of sodium carbonate does no other harm than to check the extraction of lead in the following leaching operation—at least this is according to Mr. Stetefeldt, though I have found it injurious to the extraction of silver in one instance. An excess of sodium sulphite will be converted, wholly or in part, into hypo in the precipitating vats by dissolving some of the free sulphur which always accompanies the precipitated sulphides. A chromate or bichromate used in excess would perhaps contaminate the precipitate of silver sulphide. However, the chromates seem to be the best for use when the lixivium contains calcium salts.

C. H. AARON.

December 10, 1888.

Drawing Water from the Atmosphere.

EDITORS PRESS:—The earth is an oblate sphere—its surface at the poles being 13½ miles nearer the center than at the equator. An ideal section of the earth springing from the equator, passing over and including one of its poles, and resting its other foot upon the equator opposite to the first, would present a perfect arch. Now, if the buttresses be removed, the arch will fall; also, if great weights be piled upon its top, it will be crushed in. The latter process has been going on in regard to the earth's poles ever since ice and snow have been formed upon the earth.

Evaporation takes place chiefly in tropic and temperate zones, and a large portion of that evaporation is carried by atmospheric and electric currents to the poles, where it is deposited as snow or ice. By this process vast accumulations of ice have been piled up at the north and south poles, until an unequal pressure and weight has been aggregated there to an extent which has caused serious disturbances not only in the earth's crust, but also in the inclination of her poles. This excessive accumulation of ice at the poles has unbalanced the planet on her axis, given to it a gyrating motion, and caused a retrocession of the equinoxes by which the year is being gradually lengthened.

It has occurred to me that at least a partial remedy for all this disturbance may be found within the reach of man—that a large portion of the moisture which is constantly finding its way to the polar regions might be intercepted by artificial means, and made to become a benefit and blessing to the inhabitants of the earth instead of a harmful process.

The means to be adopted I would describe as follows:

What causes condensation of moisture on the window-pane which all may have seen? The surface of the glass is covered with microscopic points, and, being cooled, the layer of air next it falls, allowing the vapor vesicles to flow near the points on the glass; but at equal temperatures and pressure the specific gravity of vapor and air is as five to seven; then the vapor can only come five-sevenths the distance, except another force is exerted. This force is the attractive power of the point—the attraction of gravitation. Now, when a vesicle flows upon a point, that point becomes blunted, loses its power of attraction for the time; also the latent heat of the vesicle being rendered sensible and radiant, pushes the vesicles away. These retarding forces prevent all the water in the atmosphere from being poured out so soon as the dew-point is reached. In the zone of maximum moisture, overhead, the dew-point is always present and the vesicles and droplets from friction are highly electrified. Now, if we place a condenser at a proper height in the atmosphere in the nature of a captive metallic balloon electrically insulated, we will have not only the unimpeded attractive power of the point, but impact from the current, and if the cable be an electric conductor, we will have the vesicles and droplets attracted with great velocity, which, at a small outlay, should give a large flow of water where required. The appliance having within about 200 feet radius the rain-attracting power of many acres of forest or mountain, such an apparatus might cost about \$3000.

What causes a waterspout? Increased solar heat forms numerous clouds, which, reflecting solar heat and light toward a focus, gives increased tension and electric excitement to the vesicles around, causing the clouds in the vicinity to be attracted toward the focus, where, being abnormally heated and electrified, the vesicles repelling each other endeavor to escape. Those going upward become condensed, give off their latent heat, which, entering the surrounding vesicles, pushes them away in every direction. They cannot escape laterally because of tension and electric currents. They are therefore pushed downward, and crowded together, intercept the solar rays, so as to form a dense, black, intensely electrified cloud, cone-shaped, to bore its way downward.

Now the specific heat of the earth's crust becomes sensible from pressure as we descend; and the inclosed water is converted into steam, causing evaporation night and day from pressure. When a black electrically positive cloud from above comes within the attracting distance of the negative vapor in the water, a rushing to the point occurs, an upward cone is formed and connection through the comparatively dry air—non-conducting—near the surface being completed, the waterspout is formed, always fresh though from the ocean, being formed from vapor. We need only then cause negative excitement on the earth's surface to force the water from above downward. There is always abundances of water in the atmosphere as vesicles and droplets. See *San Francisco Evening Post*, Nov. 20, 1886, "After the Earthquake Rain from a Cloudless Sky." In this instance the steam generated within the earth caused such negative excitement as to act on the positive vapor through crust and dry air at surface forcing the rainfall on Mr. Hoyle's farm near Dawson.

Again: *San Francisco Bulletin*, Nov. 18, 1888, "Rain and Railroads." In this case the rails become magnetized from jolting and cause the electric current overhead to deflect from its north and south direction at right angles, causing a stasis or jam of ice particles, forcing them to fall from gravity and set up the action of rain. Also the trucks running struck the key-note of thunder with proper amplitude of vibration, producing rain likewise. These

are some methods explained—and there are others—whereby rain in abundance can be had as required so as to open up all the deserts and in time the polar regions for settlement and wipe out epidemics; for when water is withdrawn from atmosphere by art, ice, to a corresponding extent, is removed from the poles and with it the cold.

I ask this opportunity of explaining to the public so that complicity be at once formed to operate for the common conservation.

MICHAEL CAHILL.

San Francisco, Dec. 15, 1888.

The Australian System of Voting.

The Australian mode of voting is beginning to attract attention. It is no experiment. For several years it has been in successful operation in England, Scotland, Ireland and Canada. It has been adopted in Massachusetts, and will go into operation in 1889. It passed both Houses of the New York Legislature at the last session, but was vetoed by Gov. Hill. The object of the system is to prevent bribery and intimidation, overthrow as far as possible the dangerous power of bosses and political machines, and place all candidates upon an equality before the law.

Upon approaching the polls, the voter receives at a convenient place, from two officials selected from the opposite political parties, a single ballot, on the back of which is indorsed a stamp or signature sufficient to identify the ballot as official. On the face of this ballot is plainly printed the names of all the candidates, designating the respective office for which each one aspires. This ballot is in the following form:

	For Mayor.	Vote for One.
Democratic,	John Doe,	
Republican,	Richard Roe,	
Prohibition,	David Smith,	
Independent,	Samuel Jones,	
	For Coroners.	Vote for Two.
Democratic,	Alanson Jacobs,	
	Harvey Sylvester,	
Republican,	Martin Rawson,	
	Wyman Simpson,	
Prohibition,	Valentine Remsen,	
	Victor Sampson,	
Independent,	Erastus Myers,	
	Samuel Bixby,	

On receiving the ballot, the voter passes into a booth where he is absolutely secured from observation, and prepares his ballot by placing in the blank columns a cross opposite the name of each candidate he wishes to vote for. He may write in the blank places the names of each candidate he desires to vote for, if he prefers. If there are several candidates for the same office, as the coroners, for instance, in the above example, or Presidential electors, and he wishes to vote a straight party ticket, he must place the cross under the party name, or draw it through the blank column allotted to the party's candidates. This means that he has voted for each candidate named in the aforesaid space.

After he has thus prepared his ballot, he folds it in such a way as to wholly conceal the face and expose the indorsement on the back. The ballot is then passed to the inspector, who recognizes it as proper from the indorsement. It is then dropped into a box and the voter gives way for others. But from the time he has received the ballot till it is voted, he is allowed to have no communication with any one but the election officers, and with them only for official purposes. No person is allowed to be present in the polling-places or about it but the election officials.

Upon proof that the voter is illiterate or physically unable to read and fold his ballot, he may call into the booth officers appointed and sworn for the purpose, who may aid him in preparing his ballot. When a ballot is accidentally destroyed or defaced, it may be exchanged for a clean one. To secure absolute secrecy, every ballot must be voted or returned. This explains the need of the official indorsement. Were it not for the indorsement, a piece of blank paper outwardly resembling the ballot might be voted, and the voter would then be able surreptitiously to carry away an official ballot which could then be prepared by a bribed voter. Such a fraud was long known in the Colonies as the "Tasmanian dodge," and was successfully perpetrated in Australia till the Government cured the evil by requiring every ballot to be indorsed and returned if not used.

Under this system it is absolutely essential that the ballots be printed at public expense and distributed by officials appointed for that purpose. This makes it necessary that the candidate of the respective parties be certified to the proper authorities at least 15 days before the election, and local elections at least ten days. The scheme proposed by the Yates-Saxton bill of New York, which Governor Hill vetoed, is perhaps as convenient as could be made. Under it, State nominations were to be certified within 15 days before the election, and local nominations 10 days before election. Nominations of a political party which at the next preceding election polled three per cent of the whole vote were to be certified by party officers; independent nominations, if for a State officer, were to be certified by a thousand voters, and if for a local office by a hundred. Having outlined the Australian system of

voting, we may summarize some of the reasons that are assigned for its adoption. Penal laws have been made to prevent bribery and intimidation. It is a well-known fact that they have been largely ineffectual. The only remedy is the most absolute secrecy, and under the Australian system this is secured. The most timid among hirelings and dependents is therefore secure. The only proof possible of an elector's vote is his own uncorroborated statement. No other is possible. This is fatal to bribery. Bribers are not likely to invest money on the faith of a bribed man's naked assertion.

The Australian system banishes corruption funds. Under our system ballots cannot be printed nor distributed without money, and are not liable to be faithfully handled unless the trusty workers are rewarded. The election committee having this in hand have a plausible reason for demanding money from its beneficiaries and official patronage from the successful party. It is the necessity for funds that justifies assessments and gives a color of voluntary contribution to what are in fact sales of nomination and office. In short, it garnishes on the outside as party fealty what is really a corruption fund. This develops into political jobbery, and offices are bought and sold as the *Pætorian* guard sold the Roman purple. Poor men can obtain no political advancements without being burdened with obligations they are unable to redeem unless they resort to fraud and perjury. Under the Australian system this political monster would be destroyed. When the State assumes the function of providing ballots there would no longer be the necessity for workers at the polls. The excuse for raising and using corruption funds would disappear. There would be no need of assessments. Political machines would become a thing of the past. Trafficking in office would be replaced by political dissection and the power of the machine by the voice of the party.

A moment's thought will show that this is no chimerical conclusion, that these and other abuses would be effectually removed by this method. The ballots containing the names of the candidates are printed at the public expense, only one official ballot is delivered to the voter, and that by sworn officers; the voter is utterly secluded when he prepares his ballot, and from the time he receives it till it is dropped in the box he has no communication except with the election officers. The whole thing is veiled in absolute secrecy, and secrecy is the remedy for many evils.

The Sight-Seer's Headache.

Of the lighter penalties which pleasure entails, none probably is more widely known and felt or more persistently endured than the sight-seer's headache, remarks a writer in a contemporary. It is nature's tax levied on the comfort of that great body of happy idlers to which we all at some time or other belong. It is epidemic among the frequenters of museums, picture-galleries and exhibitions. The very general prevalence of this variety of headache, and its independence in many instances of any vitiation of the atmosphere, teach us to look for its explanation in other causes. The effort of mind implied in long-continued observations, even though this does not involve the strain of study, has probably an appreciable, though a secondary, influence.

Fatigue certainly has an important share in its production; but it is with most persons rather fatigue of muscle than of brain. The maintenance of the upright posture during several hours of languid locomotion, the varied and frequent movements of the head, commonly in an upward direction, and the emilar and equal restlessness of eyes whose focus of vision shifts at every turn as a new object presents itself, form a combined series of force more powerful in this respect than the enlightenment and frequent change of mental interest and attention by which they are accompanied. The muscular strain implied in these movements is necessarily very considerable. It affects more or less every member of the body, but the distant localization of the resulting ache has probably much to do with the unusual activity of the cervical extensor and rotator muscles, and of the muscles which move the eyeball. Whatever the minor influences at work, therefore, there can be little doubt that mere fatigue is primarily accountable for this most general form of headache, and that rest and nourishment are most reliable antidotes.

The utility of stimulants for this purpose is necessarily temporary and deceptive. One improvement on existing arrangements ought to be of real assistance to the suffering sight-seer, if more generally introduced by responsible authorities. The comparative scarcity of seats in many places of amusement has often been noticed. It would be much to the public advantage if this want were supplied. For the attendant at exhibition stalls a chair for occasional use is an absolute necessity.

At Portland the highbinder have been ordered from town. The Chinese merchants co-operate with the authorities in thus getting rid of a lawless and murderous crowd.

THE Fresno *Republican* says coal from local mines at \$7 a ton settles the cheap-fuel question in that city.

THE trustees of the Lick estate have expended altogether about \$2,000,000 and have still \$917,000.

Educated Indians.

Our engraving affords material for interesting studies in physiognomy. It represents a recent graduating class at an Oregon institution for the improvement of the Indian, known as the Indian Training School, which is located in Marion county, four miles north of Salem.

The school was formerly located in Washington county, at Forest Grove, a lovely little village, situated 25 miles from Portland. It was organized by Capt. M. C. Wilkinson, a philanthropic gentleman belonging to the army, who was detailed from that body for this purpose. The school opened in 1880 with 14 boys and four girls from the Puyallup reservation.

The old school buildings were destroyed by fire in 1885, and thus nearly 200 children, big, little and old, were homeless. Just where to go or what to do, none knew.

It was finally decided to locate the school

housework and needlework, and by the supervision of superintendents do the sewing, cooking, washing, ironing and mending for all the children of the school.

When first brought from their native woods and wilds, they show a decided dislike for all rules, regulations and usages of the school. They stand around and maintain a stolid quiet, refuse to talk or answer questions, are sullen and stubborn, show indifference to all things. By observation and force of example they are led little by little to "fall in line." They take most readily to the military drill and fall in line at call of bugle.

Persons are admitted to the school from 7 to 30 years of age, and are kept in school six years or more if necessary.

With reference to Representative Butler's bill for an appropriation of \$1,000,000 for a 60-inch telescope to be mounted in the National Observatory, Alvin Olark, the renowned maker

Animal Chlorophyl.

A correspondent of the *Journal of the Franklin Institute* contributes to that publication the following notes on the occurrence of animal chlorophyl: Out of 12 species of sponge examined by Prof. MacMunn, ten contained chlorophyl; adding to these seven sponges studied by Krukenberg, we have 17 sponges proven to contain chlorophyl by means of spectroscopic examination and chemical reagents. With regard to this chlorophyl, Prof. MacMunn says: "I have no hesitation in saying that no difference worth mentioning was observed between it and vegetable chlorophyl." Chemical reactions proved it to be of purely animal origin; marine algae are often to be found growing into the sponge substance, but great care was taken in these experiments to select portions in which, even when examined microscopically, with powers up to 1250 diameters, no vegetable growth appeared. Prof. MacMunn does not think it necessary that the co-existence of starch with chlorophyl should be demonstrated in order to prove the presence of animal chloro-

THE WEAR OF RAILS.—The comparative wearing qualities of iron and steel rails formed a very fruitful topic of discussion at one time in railroad circles, but the question suddenly lost its vitality when the price of steel rails fell below the cost of production of iron rails. It is, therefore, a matter of much less interest than would have been the case, say ten years since, to note the experience in this respect of the Wabash railway, which has just been made public. The company removed from its tracks some iron rails which had been first laid down in 1856, and about the same time they took up some English steel rails which were first used in 1873. The iron rails, after a life of 32 years, were sold to be remanufactured, and the steel rails, which had been in use for 15 years, were relaid on a branch road, where they are expected to last for 12 to 15 years more. The "expectation of life" in either case would therefore seem to be nearly the same, with the difference in favor of the iron rails, probably due to the fact that the latter began their career in an era of less traffic, slower trains, lighter locomotives and smaller freight cars.



Photo-facsimile.

GRADUATING CLASS OF 1886, INDIAN TRAINING SCHOOL, CHEMAWA, OREGON.

Dewey Eng. Co.

at Chemawa, and equip the undertaking more elaborately and in keeping with the name and position of a Government like ours. The school grew and flourished abundantly under its first president, Rev. Mr. Minthorn, and Prof. Coffin, principal teacher. The school has now been in successful operation at its present location for three years, with Prof. John Lee as superintendent. There are now 180 Indians in attendance from the various tribes, representing in all 29 different tribes, from all along our coast, from Alaska to California, and from Montana to Oregon. There are 72 girls and 108 boys. The school is limited to 200, and much difficulty is encountered in keeping up this standard of attendance. The pupils are taught in four grades, boys and girls together, in the public schools. The studies of the fourth or highest grade are arithmetic, grammar, physical geography, Child's Book of Nature and History of the United States. They are constantly going and coming. They are a prey to homesickness. The restraints of the school, its surroundings and all, are most burdensome and overwhelmingly oppressive to the Indian, and in desperation he seeks relief and freedom by "running away."

The boys are instructed in trades and farm labor, many of them showing no little skill in the use of tools. They are taught shoemaking, cabinet work, blacksmithing and wagon-making. The girls are taught

of lenses, says he does not believe that better results can be obtained by constructing so large a glass—that is, provided it is located on the Atlantic Slope. The 26 inch glass at the Harvard Observatory is, he says, large enough, but in the wonderfully clear air of California and the Pacific Coast region, he says the largest-sized glasses can be used with effect.

THE bullion statement of the Consolidated California and Virginia mine for last month is as follows: Total ore worked, 9347 tons. Total bullion produced—gold, \$105,422.74; silver, \$114,951; total, \$220,373.74. Assay yield on bullion per ton—gold, \$11.27; silver, \$12.29; total, \$23.57. Average assay value of the ore per ton, \$28.42.

THE Santa Paula Chronicle says: An abundant flow of oil has been struck by the Sespe Oil Company, in well No. 18, in which boring has been in progress for some weeks. One hundred barrels were pumped in the first 15 minutes after it was opened.

MR. WENBAN, the owner of the Cortez mine, Nevada, states that the mine has not been sold in London as reported. It was incorporated in London, so that in case of his death it would be in better shape than if he held it as an individual.

A NUMBER of wild geese were found dead at the base of the electric-light tower in Chico last Saturday morning. It is supposed they dashed against the lantern during the night, which was unusually foggy.

phyl. Even in plants it is not always possible directly to observe starch as the product of assimilation in the chlorophyl grains; in such cases the starch produced in the chlorophyl may be at once transformed into fat.

If chlorophyl is present in sponges, the question arises, of what use is it to them? It cannot be of use for mere surface coloration, as its tint is, in most cases, disguised by yellow, red or other color, and it must, therefore, be of use, either for purposes of assimilation, as in plants, or for respiration. Since chlorophyl is usually much more apparent in the external parts of the sponge, it is likely that it has something to do with the absorption of light rays. Prof. MacMunn "cannot help thinking that the very peculiar absorption spectrum of chlorophyl indicates a property which is peculiar to it, and which enables it to sift out rays of a certain wave-length to be utilized in the syntheses of the carbohydrates." The latest researches suggest that chlorophyl may be a respiratory pigment, and all recent botanical knowledge tends to explain its function as that of a carbonic-acid carrier. It may primarily remove the waste CO₂, and afterward, by the influence of light rays, build up from CO₂ and from water, some substances, such as starch, glycogen, sugar or fat, which are of direct service to the animal or plant. If this is its function, chlorophyl may be of great use in the constructive metamorphosis of animals.

PROF. FOREST SHEPHERD, who had made a thorough study of mineralogy and mining, and was well known as a specialist, died at Norwich, Conn., lately, aged 88.

Nevertheless the facts cited go far to sustain the position of the erstwhile advocates of the continued use of iron rails, that well-made iron rails would sustain the wear and tear of regular railroad traffic as well as steel rails. It is worthy of note, in this connection, that the Wabash steel rails cost \$103 per ton, in gold, in 1873, and that the old iron rails were recently sold for more than three-fourths the price of new steel rails, ton for ton.

IMMENSE sales of oleomargarine are reported in Cincinnati and Chicago on account of a rise of 5 cents a pound in creamery butter. Chicago is trying to control the butter market.

A PARK county, M. T., jury recently made the mistake of returning a verdict that "this jury do hereby agree to disagree," and Judge Liddell fined each member \$5.

It is reported that the Rothschilds have purchased the Santa Rosalia copper mine, in Boleo district, near Mulege, on gulf side of the Lower California peninsula.

COAL has recently been found in the Gabilan mountains, southeast of Salinas, and also in the hills near San Luis Obispo.

THE output of the Oregon Iron and Steel Company at Portland is 48 tons of pig iron and 25 tons of iron pipe each day.

SUITS have been commenced by the Government against Nevada parties for \$13,000,000 for cutting timber.



A. T. DEWEY.

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SAN FRANCISCO

Saturday Morning, Dec. 22, 1888.

TABLE OF CONTENTS.

EDITORIALS.—Cheaper Coal; Money in Circulation; Mine Hoists, 400. Passing Events; The Coming Eclipse of the Sun, 412. The Round Valley Reservoir; Brewer's Amalgamator, 413.

ILLUSTRATIONS.—Double-Shaft First Motion Hoisting Plant with Two Fuse-Drums, 409. The Round Valley Reservoir and Dam, 413.

CORRESPONDENCE.—Lixivation of Silver Ores, 406.

MISCELLANEOUS.—The Australian System of Voting; The Sight-Seeer's Headache, 406. Educated Indians; Animal Chlorophyll, 407.

MECHANICAL PROGRESS.—Facts About Metals; Recent Advance in the Metallurgy of Iron; A New Cement, 410.

SCIENTIFIC PROGRESS.—The Paradoxes of Science; A Curious Little Discovery; Photographing the Sun or Moon; Argentine; The Great Eruption at Krakatoa; An Electric Actinometer; A New Method of Preparing Silicon; How it was Settled; And Interesting Facts; A New Lamp for Ships; An Electro-Magnetic Piano, 410.

USEFUL INFORMATION.—A Lake of Volcanic Glass; A Trade in Dog Skins; Horses on Snowshoes; Cleaning Zinc; Vulcanized Fiber for Cogs; Stout Car Horses; The Way to get Rid of Tattoo Marks; Our Rice Production; The Bell-Cord Doomed, 411.

GOOD HEALTH.—Health of the State; Anti-Hydrophobia; Prevention of Scarlet Fever; Electricity for Yellow Fever; Oil of Bay vs. Fies; Water and Obesity; One Probable Cause of Left Handedness; Tobacco Smoke and Disease Germs, 411.

ENGINEERING NOTES.—De Lesseps Still on the Ragged Edge; The Sweden-Denmark Tunnel; Supplement of Bridge Piers, 411.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 412-13.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board; Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 416.

Business Announcements.

[NEW THIS ISSUE.]

Assessment Notice—Lord of Lorn G. & S. M. Co. Dividend Notice—S. F. Savings Union. California Iron Yard—H. J. Rogers & Co. Stockholders Meeting—Superior M. & M. Co.

See Advertising Columns.

Passing Events.

The Ridgeway mine, New River district, has been sold to an English company and Major Toms, one of the owners, has returned from London. We gave an account of this mine some time since, when we saw Major Toms, who was then on his way to London. The advent of capital into New River would not only benefit that camp, but other portions of Trinity county.

There is quite an excitement at Needles, Cal., about reports of a gold-find 20 miles south of that place, and numbers of men are leaving for the new field.

Amador county is having luck of late in good strikes in old mines. Recently the North Star, at Sutter Creek, struck exceptionally rich ore, and now the Wildman, at the same place, has struck it. At a depth of 600 feet the superintendent reports a 12-foot ledge of \$10 rock.

The Phoenix Herald of the 10th says: The Wratten strike in Centennial district is said to be the biggest thing in the mining business ever

discovered in Arizona. Three men took out \$36,000 in seven days. There is some feeling among ironworkers and other mechanics in this city about individuals and street-railroad companies sending East for ironwork instead of having it done here. One company, whose franchise is pending, has finally agreed to do the work at home, and pressure will be brought to bear on others to the same end.

The Coming Eclipse of the Sun.

Suggestions to Observers.

The total solar eclipse of the sun which occurs on Tuesday, January 1st, 1889, is a very important astronomical event, and a number of parties will be in the field in this State and Nevada for observation. The general direction of the path of the total phase through California and Nevada is northeast of compass. The breadth of the path of totality is 93 miles, as shown in the map published in the PRESS on November 10th. San Francisco is 55 miles southeast of the southern limit of this path of totality, so that in this city the sun will be only about eleven-twelfths obscured. It is so rarely that an opportunity such as this offers that no doubt a great many people besides the astronomers and photographers will go from this city to points on the line of totality.

The beginning of a total solar eclipse is marked simply by the small black notch made on the luminous disk of the sun by the advancing edge or limb of the moon. This always occurs on the western half of the sun as the moon moves from west to east in its orbit. An hour or more must elapse before the moon has advanced sufficiently far in its orbit to cover the sun's disk. During this time the disk of the sun is gradually hidden until it becomes a thin crescent.

Time Signals.

The Director of the Lick Observatory, Prof. E. S. Holden, has compiled from various sources a number of brief suggestions which will be of use to intending observers. On the 29th, 30th and 31st of December and on the 1st and 2d of January, the time signals of the Lick Observatory will be sent to nearly every railway station in California automatically from a standard mean-time clock. Observers should compare their watches with the beats of the sounder at noon in the nearest railway station, when possible. These signals will be similar to the regular noontime signals of the Observatory which furnishes the official time to the Southern Pacific Co. These signals commence with a warning "rattle" between 11:56 and 11:57, Pacific standard time; there is then a pause of one minute (during which the wires are cleared for the transmission of the "noon signal"), and the first beat of the clock, which will be heard at the distant telegraph stations, is 11h. 55m. 00 sec. of Pacific standard time. Thereafter the clock will beat every even second—leaving out the 58th second. The first beat after this short pause is 11:59:00, and the clock will continue to beat the even seconds until 11:59:50, when there will be a pause of 10 seconds, and the last beat heard will be 12:00:00 noon of Pacific standard time (equal to 8:00 of Greenwich mean time).

If it is not practicable to visit one of the railway telegraph stations at noon for these signals, the beats of the Lick Observatory clock may be heard by telephone at any time of the day by following out the directions given below:

To hear the beats of the Lick Observatory Standard clock, call the central office, and ask the San Jose operator to put on the Lick Observatory clock signal. When this is done, the beats of the Lick Observatory clock will be heard every two seconds. At the end of every minute the 58th second is omitted. At the end of every 5th minute (0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60), the 52d, 54th, 56th and 58th seconds are omitted.

To set your watch right: Get the beats of the Lick Observatory clock in your telephone, and hold your watch where you can see the second hand; listen to the beats, which are heard every two seconds, until a pause of more than two seconds comes; the first dot after such a pause begins some minute. If the pause is ten seconds long, the minute is one of the numbered minutes of your watch-dial.

Prof. Schaeferle of the Lick Observatory has computed for Prof. Holden the approximate Pacific-Standard time of the beginning and ending of the total phase, and his results are exhibited in the following table. They will serve a useful purpose in enabling intending observers to select a suitable station:

Time and Duration at Different Points.

Place.	Total Eclipse.		Duration.
	Begin.	Ends.	
h. m. s.	h. m. s.	h. m. s.	m. s.
Mendocino.....	1 45 31	1 47 14	1 43
Punta Arenas.....	1 45 2	1 47 5	2 03
Ukiah.....	1 44 59	1 47 1	2 02
Cloverdale.....	1 46 44	1 48 32	1 48
Lakeport.....	1 46 31	1 48 31	2 03
Lick Observatory Station.....	1 46 31	1 48 32	2 02
Calistoga.....	1 48 15	1 48 62	0 37
Willows.....	1 47 41	1 49 40	1 59
Normin.....	1 47 46	1 49 49	2 03
Orland.....	1 47 43	1 49 33	1 50
Maxwell.....	1 47 56	1 49 58	2 02
Corning.....	1 47 52	1 49 24	1 32
Tahama.....	1 47 59	1 49 12	1 13
Colusa Junction.....	1 50 25	1 50 5	1 55
Sesma.....	1 48 02	1 49 16	1 14
Colusa.....	1 48 3	1 50 17	1 54
Chico.....	1 48 19	1 50 16	1 57
Nelson.....	1 48 32	1 50 35	2 03
Yuba.....	1 49 13	1 50 54	1 41
Marysville.....	1 49 17	1 50 55	1 38
Corville.....	1 48 59	1 51 1	2 02
Grass Valley.....	1 50 25	1 51 47	1 22
Nevada City.....	1 50 43	1 54 12	1 20
Quincy.....	1 49 53	1 51 52	2 00
Downieville.....	1 50 21	1 52 16	1 55
Susanville.....	1 50 24	1 51 50	1 26

Approximate times of first and last contacts. (Pacific standard time.)

	1st Con.		4th Contact.	
	h. m. s.	h. m. s.	h. m. s.	h. m. s.
At the Lick Observatory.....	0 24 58	3 9 36		
At Prof. Davidson's Observatory, San Francisco.....	0 23 8	3 8 58		
At the Students' Observatory, Berkeley.....	0 23 31	3 9 8		
At the Lick Observatory field station.....	0 22 19	3 7 17		

The point of first contact will be about 91° from the north point of the sun's limb measured toward the west.

What to Expect.

It may be observed that the actual amount of the sun's light may be diminished by two-thirds or three-fourths of its ordinary amount without its being strikingly perceptible to the eye. What is first noticed in an eclipse is the change which takes place in the color of the surrounding landscape, which begins to wear a ruddy aspect. This grows more and more pronounced, and gives to the adjacent country that weird effect which tends so much to the impression of a total solar eclipse. The color of the light becomes more and more lurid up to the moment when the sun has nearly disappeared. If the spectator is upon the top of a high mountain, he can then begin to see the moon's shadow rushing toward him at the rate of about a mile a second. Just as the shadow reaches him, there is a sudden increase of darkness; the brighter stars begin to show on the dark lurid sky, the thin crescent of the sun breaks up into small points or dots of light, which suddenly disappear, and the moon itself, an entirely black ball, appears to hang isolated in the heavens.

An instant afterward the sun's corona is seen surrounding the black disk of the moon with a soft effulgence quite different from any other light known to us. Near the moon's limb it is intensely bright, and to the naked eye, uniform in structure; 5' or 10' from the limb this inner corona has a boundary more or less defined, and from this extend streamers and wings of fainter and more nebulous light. These are of various shapes, sizes and brilliancy. No two solar eclipses yet observed have been alike in this respect. These appearances, though changeable, do not appear to change in the time the moon's shadow requires to pass from the first contact with the earth to its last.

Superposed upon these wings may be seen (sometimes with the naked eye) the red flames, or protuberances, which were first discovered during a total eclipse. These need not be more closely described here, as they can now be studied at any time by the aid of a spectroscope. These are the appearances to the naked eye. In the telescope the corona appears a very complicated structure. It was formerly doubtful whether the corona was an atmosphere belonging to the sun or the moon. At the eclipse of 1860 it was proved by measurements that the red prominences belonged to the sun and not to the moon, since the moon gradually covered them by its motion, they remaining attached to the sun. The corona has also since been shown to be a solar appendage.

The total phase of a solar eclipse lasts for a few minutes (never more than six or seven, and about two minutes only at the eclipse of January 1, 1889), and during this time, as the eye becomes more and more accustomed to the faint light, the outer corona is seen to stretch further and further away from the sun's limb. At the eclipse of 1878, July 29th, it was seen to extend more than 6° (about 9,000,000 miles) from the sun's limb. Just before the end of the total

phase there is a sudden increase of the brightness of the sky, due to the increased illumination of the earth's atmosphere near the observer, and in a moment more the sun's rays are again visible, seemingly as bright as ever. From the end of totality till the last contact the phenomena of the first half of the eclipse are repeated in inverse order.

The phenomena of a total eclipse are so various, so startling, so impressive, and so novel and fascinating, that those engaged in observation will do well to confine their attention to that special portion which they can best observe, leaving the other portions to other members of the party. During the observation of an eclipse, it is necessary that quiet and stillness should be maintained. People who are only looking on with the naked eye should be careful not to disturb observers who are using instruments for precise observations. Those who intend reporting to the Lick Observatory should state the nature and character of instruments used with details of size, power, etc. Notes at the time should be brief and condensed, but written out at length afterward and without conferences with others.

Choice of Observing Station.

A position should be selected which is free from the annoyances of sand, dust, and dazzling reflections from water, and the noise and din of a thoroughfare; which affords a clear view of the portion of the heavens to which the attention will be directed, and an unobstructed meridian, if precise observations for time are contemplated; and elevated above the ordinary range of fogs, where fogs are to be apprehended. The place should be noted and described, and its bearing and distance from some public building or prominent landmark should be determined. It should be resorted to one or more days in advance in order to have everything in readiness and suitably arranged.

Observations of the Contacts.

These observations consist in observing the instants of beginning and end both of the eclipse and total phase, together with the positions of the points of contact, and serve to give a precise determination of the moon's place. It is desirable that the beginning and end of the eclipse should be carefully observed at all fixed observatories within its limits. The beginning and end of the total phase can only be observed within the belt of totality. The value of such observations depends on the precision with which the instant of contact is appreciated and its time recorded and the exactness with which the correction of the chronometer and the latitude and longitude of the place are determined.

Near the Limits of the Shadow.

The intelligent inhabitants of towns near the edge of the belt of totality may furnish observations by which the limits can be accurately determined by simply noting how many seconds the sun is wholly obscured. The following directions for doing this are mostly taken from a circular issued by the U. S. Naval Observatory asking for observations of the eclipse of August 7, 1869:

Instruments.

The only indispensable instrument is a good watch, provided with a seconds-hand, and having a white face. It may be well to provide a lighted lantern for use in case of necessity. The minute-hand of the watch should be carefully set so as to be on the exact minute when the seconds-hand is at 60s. This being done it is no matter how far wrong the watch may be.

A good auxiliary will be a common spyglass lashed to a round post so as to be steady enough to give an easy view of the sun. To lessen the brilliancy of the sun, cover the object-glass with a pasteboard, tin, or wooden cap having a round hole three-fourths of an inch in diameter cut in its center.

The spyglass will be worse than useless unless one is accustomed to its use, and has it fastened so as to be steady.

An opera-glass held in the hand may also serve a good purpose. A smoked glass should also be prepared, but one part of the glass should be smoked very lightly so that it can be used should the day be cloudy.

Arrangements.

Each observation should be made by a party of three persons. Only one instrument of each kind—watch, glass, etc.—is needed by a party. A station should be selected where they will be free from all interruption, either in the open

air or at an open window, facing south or south-west. Be sure that the sun can be seen from your station at 1:30 P. M., by a trial one or two days before the eclipse. One, at least, of the party must have a pencil and notebook at hand to record the time.

The Observation.

When the visible part of the sun is reduced to the narrowest crescent, the holder of the watch, keeping his eye on the face, will begin to count the seconds aloud; the holder of the smoked glass, with or without the spy-glass, will watch for the last ray of true sunlight, being careful to look through the brightest part of the glass the eyes will hear without inconvenience; and the third observer, if there be one, will look for the disappearance of sunlight with the naked eye, and stand ready with pencil and paper to record the time. When the last ray of the sun has disappeared, the observer with the glass will call "time," and the exact second at which the call was given must be immediately written down. The minute most has also carefully noted and immediately recorded. It is best to record the seconds first, and then the

is of the opposite kind, and should be equally avoided. It is that the light of the brilliant rose colored protuberances which surround the dark body of the moon during the total eclipse may be mistaken for sunlight, and thus the critical moment be suffered to pass. The return of sunlight will also be preceded by a reddish glow on the border of the dark moon, which must not be mistaken for the sun. All the recorded times, etc., should be forwarded to the Lick Observatory.

Drawings of the Corona

Spectroscopic observations are of special importance during the total phase. The meteorological observations should include the ordinary record of the barometer, dry and wet bulb thermometers, wind, clouds, etc. Near and during the total phase the changes of the thermometer and hygrometer, formation of clouds or fog, or dew or other atmospheric variations, should be specially noted. Drawings of the corona should also be made by those able to do so.

A really important observation can be made in the following way: Place a circle of wood or iron, 12 inches in diameter, near the top of a telegraph or other pole, and place the eye at

The Round Valley Reservoir.

One of the largest enterprises in Plumas county, this State, is the Round Valley reservoir and water-works owned by Messrs. McGill & Bidwell. The reservoir is at an elevation of 800 feet above Indian valley. An engraving of the dam and reservoir is given on this page. The construction was commenced in 1868, and up to this date represents a cost of over \$100,000. Its purpose is to supply the mines of Greenville district with the necessary water. Those dependent upon the reservoir are the Johnny Bull, Drury, Pacific, Forest King, the Chabroes group, Round Valley Consolidated, New York, Plumas Con., O'Tool and Summit, McLeslan Claims, Green Mountain, and others. The company have eight miles of ditch for the distribution of the water, on the line of which is an inverted siphon composed of 5000 feet of 22 inch pipe crossing a canyon under a pressure of 400 feet. The company make their basis of rates for water furnished on 50 per cent of cost of steam-power, including the water used for battery purposes. This estimate is made with the assumption that both plants are on the

Brewster's Amalgamator.

In the PRESS of December 8th appeared a communication from Geo. J. Rockwell, giving an account of tests of ores at Bodie, in which it was stated that the Brewster amalgamator possessed "none of the merits claimed for it." We are informed by the superintendent of the Standard Consolidated M. Co. that there were four tons of ore worked by Mr. Rockwell, as directed by him, and the results were as given in the communication; but he says nothing of the cost of the run, which far exceeded the receipts. As to the Brewster amalgamator, there was but a small quantity of ore worked by that, the experiments being mainly confined to tailings. There is no doubt that the amalgamator is of no advantage in working Standard ores, but this should not give the idea that the machine is of no benefit anywhere. The amalgamator is doing good and satisfactory work at the Homestake mine in the Black Hills, and seems well adapted to the ore there. While Mr. Rockwell's statement is correct as to the fact of the machine being of no benefit in working the ores at Bodie, it has



THE ROUND VALLEY RESERVOIR AND DAM.

minutes. The observers will then await the return of sunlight, the count of seconds being kept up. The first flash of true sunlight will seem to burst out suddenly, and the minute and second of its appearance must be immediately recorded with the same care as the time of disappearance. The difference of the two times gives the duration of totality.

Valuable observations of the duration of totality can be made at any points at or near the limits of the line of totality, in particular at or near the points named below. Observers should remember that the fact that the eclipse was not total at their stations is just as important as the other fact that the duration of totality was one, two or three seconds. If these observations are carefully made, and promptly communicated to the Lick Observatory, they will serve a useful purpose.

Special Precautions.

In appreciating the beginning of totality, there is danger of error from two sources. The first is, that the sun's crescent may become so narrow as to become invisible through the smoked glass, if this be too dark, several seconds before it is really all covered, and thus the observer may call the "time" too soon. Such a mistake may be detected and corrected by the third observer looking on with the naked eye, if the following circumstances be attended to:

The beginning of total eclipse is marked by a very rapid increase of the darkness, caused by the advent of the moon's shadow. If, then, the darkness increases more rapidly after time is called than it did before, time was called too soon, and must be repeated. The other danger

about 57 feet from the disk, so that at the time of totality the center of the disk will cover the center of the sun. The position for the eye can be approximately determined on the days immediately preceding the eclipse, and a stake can be firmly driven, over the very top of which the observer is to look at the totally eclipsed sun. The sun and the inner (and brighter) corona will be bidden, and the eyes can then follow the outer and fainter portions with ease and estimate their directions (angles with the vertical post) and their lengths (in diameters of the disk). The eye should be kept in darkness up to the beginning of the total phase. It is to be hoped that photographers making pictures of the eclipse will send the original negatives to the Lick Observatory.

Excursions.

A big special excursion to run from this city to a point near Willows on the central line of totality of the New Year eclipse has been arranged by the Southern Pacific Company. Already many persons have expressed a desire to make the trip on this occasion, and no doubt there will be a full trainload. The train will leave here early in the morning of New Year's Day, and the passengers will arrive at the point of observation in time to get a full view of all there is to be seen concerning the eclipse, and they will return here in the evening of the same day. It is probable that a round-trip rate of \$5 will be made to other railroad points on the line of totality of the eclipse.

A rich silver strike has been made in the Badger mine, near Port Arthur, Minn.

ground. Thus, while furnishing the company with a handsome revenue, the mines are supplied at an exceedingly low cost. As high as \$1400 per month has been realized by the company from the water.

Owing to light winters for the past two years, the supply of water, which depends upon snow and rain, has been short, and the company has been unable to supply the demand. They have hopes to secure a good supply this season. The dam proper is 300 feet long and 25 feet in height, constructed with a rock-wall in center and loose dirt on sides. It is the most natural site for a reservoir imaginable, and its location is quite picturesque. It covers 800 acres and will hold an average depth of 15 feet of water, and has a watershed of 40 square miles. An item of no small moment is the fact that it is surrounded by miles and miles of the best timber in the State, from which must ere long spring a lumbering industry of great magnitude. Then will this great water storage be of utility in furnishing the power to run the mills that will be called into operation by lumbermen, after which it may be conducted to the fertile lands of Indian valley for irrigation.

GOVERNOR WATERMAN has said that he will not give his sanction to the bill appropriating money to the London Exposition unless the same aid is extended to the Paris Exposition, which is to be held in 1889.

CHRISTMAS will be here on Tuesday, and the PRESS wishes all its patrons a very merry and happy one. We might do this much more at length, but scarcely with more heartiness.

proved successful on ores elsewhere, and is now being generally introduced at various camps. The wording of Mr. Rockwell's paragraph on this part of the subject conveys, therefore, a wrong impression.

ACADEMY OF SCIENCES.—At the last meeting of the Academy, T. H. Hittell read a paper on the subsidence of the peninsula of San Francisco. Some fossil redwood logs and the bones of sa-lions not yet fossilized were recently found, he said, 112 feet below the surface by some laborers who were digging a well for Adolph Sutro on the San Miguel ranch; near the Almshouse. The committee appointed for the purpose of presenting a regular ticket for officers for the ensuing year, reported as follows: Pres., H. W. Harkness; 1st Vice-Pres., H. H. Behr; 2d Vice-Pres., George Hewston; Cor. Sec'y, Fred Gutzkow; Rec. Sec'y, J. R. Scupham; Treas., J. E. Tayer; Librarian, Carlos Troyer; Director of Museum, J. G. Cooper; Trustess, Charles F. Crocker, D. E. Hayes, S. W. Holladay, E. J. Molera; Irving M. Scott, George C. Perkins and John Taylor. Alphas Bull and Walter E. Bryant were appointed inspectors of election and Chas. Stephens and C. D. Gibbs, judges of election. The election will take place on January 7th.

WORK has commenced on the Cuyamaca railroad, San Diego Co. One trainload of rails has arrived, and three steamers are on the way with ties.

THE Legislature is to be asked to contribute \$250,000 to maintain a California exhibit in London for two years.

MECHANICAL PROGRESS.

Facts About Metals.

Silver will absorb a considerable number of times its own volume of oxygen when highly heated in that gas, or even in common air. This oxygen is not combined with the silver, but is given off at the moment of the solidification of the metal, a circumstance which produces the peculiar frosted or arborescent appearance common to masses of the pure metal. The presence of a small percentage of copper prevents the absorption of oxygen. According to Lampadius and Depretz, silver gives off vapor at very high temperatures. The presence of a small quantity of arsenic greatly increases the ease with which it is volatilized.

Silver alloys readily with nearly all the metals, but their use in the arts is limited to a few employed in the decorative arts and in coinage. Next to copper, it is the most readily deposited on other metals by galvanic action, hence it is used in great quantities for electroplating. Like gold, it was known to the ancients, who used it for coinage and for ornament.

Bismuth melts at about 518° F. It is but slightly oxidized by contact with air; if strongly heated, it burns with a bluish flame; at a high temperature it volatilizes freely. Its principal use in the arts is for the production of the so-called "fusible alloys," above spoken of. These are compounds of lead, tin and bismuth, in varying proportions. Several of these melt below the boiling point of water.

Copper melts at about 2100° F. It is very ductile, malleable and tenacious; at very high temperatures it is slightly volatile; it is unaffected by dry air, but in the damp becomes coated with an adherent green crust. When exposed at a red heat to the air, it is rapidly oxidized, and becomes encrusted by a black scale. At a high temperature copper burns with a green flame. Its uses in the arts and manufactures are too well known to need repetition here. Its principal alloys are brass, bronze and German silver.

Nickel is somewhat less fusible than pure iron; this would put its melting point at about 3000° F. Like iron, it is capable of becoming magnetic, but loses this property at temperatures above 660° F. Though combining readily with oxygen, it is only slightly oxidized when highly heated. Its most important alloy is that with copper, called German silver. Of late it has come into very general use for electroplating miscellaneous objects of every description.

Cadmium melts at about 500° F. It is commonly associated with ores of zinc, and, being a very volatile metal, distills off when zinc ores are roasted.

Manganese has a high melting point, but fuses when exposed to the heat of a good wind furnace. It has a strong attraction for oxygen, and will even take it from water at a low temperature. A variety of bronze containing manganese is highly esteemed.

Iron, intrinsically the most important of the metals, fuses at temperatures dependent on its purity. When containing carbon, or in the condition of cast iron, it melts at 2786° F., but when pure, or in the condition of wrought iron, a temperature of 3280° F. is necessary to melt it. Iron softens before melting, and possesses in a marked degree the property of welding. It has powerful affinities for oxygen, taking it from the air when moist, a circumstance which explains the fact that it is seldom found in a pure or metallic state, except in meteorites. Dry air at ordinary temperatures does not affect it, but when heated to redness it absorbs oxygen and becomes coated with a scale of black oxide. When in a finely divided state, the metal burns while falling through the air; and even in the condition of ordinary filings it burns with brilliant scintillations when thrown into a fire or the flame of an ordinary gaslight.

Tin melts at a temperature of 455° F. It is not acted on to any extent by air or water. When exposed to a temperature somewhat above its melting point, it absorbs oxygen greedily, and is converted into a whitish oxide, known technically as stannous powder. Tin alloys with nearly every known metal. A large proportion of the tin of commerce is consumed in the production of tin plates for roofing, and the production of tin utensils, cans, etc. Other uses are for the production of solders, and it forms one of the constituents of bronze and Britannia metal.

Zinc melts at about 770° F. It undergoes a series of remarkable changes under the influence of heat. At ordinary temperatures it is comparatively brittle; between 250° and 300° F. it is quite malleable, and in this state may be readily rolled or beaten into sheets which have the valuable property of retaining their malleability when cold. The brittleness of the metal at ordinary temperatures is doubtless to be attributed to its crystalline structure, which is probably effaced during the operation of rolling at higher temperatures. At 400° F. zinc becomes so extremely brittle that it may be readily powdered. Zinc is very volatile at a bright red heat, and in the presence of air burns with a bluish-green flame. Brass is the most important alloy. It amalgamates readily with iron, and articles thus coated are known as "galvanized"—a misleading term.

Antimony melts at about 900° F. It is

quite stable in the air, and so brittle that it can be readily pulverized. Its principal use in the arts is for the manufacture of type-metal.

Mercury (or quicksilver) is the only metal (except the exceedingly rare metal, gallium) that is fluid at ordinary temperatures. It boils at 660° F. It amalgamates freely with gold, silver, copper, zinc and tin, but only sparingly with iron. Its chief uses are for coating mirrors, in the manufacture of barometers and thermometers, and in amalgamating with gold in the production of that metal.—*Boston Journal of Commerce.*

Recent Advances in the Metallurgy of Iron

The metallurgists, evidently, have yet much to learn in understanding the influence of other elements in modifying the properties of iron and steel. In respect of its extreme sensitiveness to the presence of the smallest appreciable quantities of foreign substances, iron seems to stand alone, and the possibilities which this fact opens to investigators are almost limitless.

The peculiar effects of carbon, silicon, sulphur and phosphorus on the physical properties of iron have long been known, and play an important role in its utilization. It has only lately come to light, however, that aluminium, in so small a quantity as the one tenth of one per cent (that is, one part in 1000), renders wrought iron and steel distinctly more fusible.

More recently, the observation has been made that additions of this element to cast iron, in quantities from one-fourth of one per cent up to one per cent, produced most favorable effects, rendering inferior irons soft, and fitting them for foundry uses.

Now manganese is coming to the front as a useful addition to irons and steels, and from various sources we learn that it promises to yield results quite as valuable as those obtained with aluminium. In a paper recently presented to the Iron and Steel Institute by R. A. Hatfield of Sheffield, England, he claims to have obtained in experiments in making steel with a high percentage of manganese, "results which are entirely novel, and appear to show the way to an absolutely new sort of metal for various purposes."

His experiments were made with the idea that steel with high manganese might give a hard material, but without the brittleness of spiegeleisen, seeing that the carbon would be much reduced. The results obtained show some novel features, which it will be of interest to briefly summarize.

"After many trials a material was produced combining great strength with hardness, but the puzzling and apparently paradoxical result was discovered that, although steel, if it may be so termed, with 4 to 6 per cent of manganese, and less than $\frac{1}{2}$ per cent of carbon, was so brittle that it could be powdered under a hand-hammer, yet by adding twice this amount of manganese, just the contrary effect was produced, and a material was obtained containing many apparently new properties, as compared with any iron or steel hitherto manufactured. Briefly, the material may be described as follows: That containing from 2 $\frac{1}{2}$ to 6 per cent is extremely brittle in its cast state, then a return in strength gradually takes place, and, with about 9 to 10 per cent, a cast bar, 2 $\frac{1}{2}$ inches square, can be bent considerably out of the straight without breaking. This continues up to about 14 or 15 per cent, when a decrease occurs in actual toughness, though not in transverse strength, and after about 20 per cent is passed, then a rapid decrease again takes place. It should be stated that these remarks apply specially to the material in its cast state.

"Manganese steel is not so liable to honeycombs as ordinary steel and the addition of silicon is unnecessary. It is very fluid and can be run into thin sections, but cools more rapidly than ordinary steel, and its contraction is decidedly greater. The latter fact explains the reason of its piping and settling so much, both in the ingots and in castings; with proper heads or runners, however, this difficulty can be obviated. It is manufactured by any of the ordinary steel-making processes, the basis, i. e., the material before the manganese is added being preferably decarbonized iron (practically pure iron, Fe), or mild steel. The ferro-manganese is added in a molten state or very highly heated. The steel is then ready for casting into ingots or other forms."—*Manufacturer and Builder.*

A NEW CEMENT.—At the last meeting of the Academy of Sciences in this city, an interesting paper was read by F. Gutzkow on magnesium oxychloride, or white cement. A number of specimens were presented for the inspection of the members. One of the principal advantages of the new cement is that it can be manufactured in California. It is composed of one-half magnesium oxide, which is obtained from the magnesite deposits in the Coast Range, and one-half magnesium chloride, obtained from the various sea-salt manufactories throughout the State. It may be used for sidewalks, interior decorating, and in appearance resembles pure white marble. It has a natural polish, and above all is much cheaper than any of the other substances now in use. W. R. Bently read a paper descriptive of the great glaciers of the Selkirk, in which the speaker, assisted by a colored sketch of the principal glacier, gave an interesting and vivid description of the beautiful scenery of the Columbia river.

SCIENTIFIC PROGRESS.

The Paradoxes of Science.

The water which drowns us, a fluent stream, can be walked upon as ice.

The bullet, which, when fired from a musket, carries death, will be harmless if ground to dust before being fired.

The crystallized part of the oil of roses, so grateful in its fragrance—a solid at ordinary temperatures, though readily volatile—is a compound substance, containing exactly the same elements, and in exactly the same proportions, as the gas with which we light our streets.

The tea which we daily drink, with benefit and pleasure, produces palpitations, nervous trembling, and even paralysis, if taken in excess; yet the peculiar organic agent called theine, to which tea owes its qualities, may be taken by itself (as theine, not as tea) without any appreciable effect.

The water which will allay our burning thirst augments it when congealed into snow, so that it is stated by explorers of the Arctic regions that the natives "prefer enduring the utmost extremity of thirst rather than attempt to remove it by eating snow." Yet if the snow be melted it becomes drinkable water. Nevertheless, although if melted before entering the mouth it assuages thirst like other water, when melted in the mouth it has the opposite effect.

To render this paradox more striking, we have only to remember that ice, which melts more slowly in the mouth, is very efficient in allaying thirst.

A CURIOUS LITTLE DISCOVERY.—A correspondent of the *Electrical Review* says: "I have made a curious little discovery, which may interest your readers. It first occurred on a railway train. I happened to hold against the inside surface of the window-glass a daily paper which had been cut by a saw tooth cutter, leaving a ragged edge on which some of the bits were loose. When I removed the newspaper, some of the bits remained clinging to the glass. It was curious, and I began to investigate with larger pieces. All would stick to the glass when laid against it. I took different kinds of paper then, but the results were the same. Since then I have repeated the experiment a great number of times on different railways, and always found the glass apparently electrified. It cannot be capillary attraction, as the most porous kind of paper, if light, will stick just the same. I have had pieces of newspaper two inches square hold firmly. And a strange thing, too, the phenomenon appears as certainly in rainy weather, even when the window-panes are streaming outside. It seems to require a clean window for good results. One evening I tested seven windows in one car, and had them all spotted with bits of paper, and my fellow-travelers eyed me with suspicion as a result. Now, why does the paper stick? Is it the friction of the air outside? Hardly, because, after a five-minute stop, fresh paper will stick just as effectually. Is it due to the heat of the finger in applying the paper? No, because a lead pencil or a cork will do instead of the finger. Is it capillary attraction? I think not. I will be glad to have some of your readers investigate and report. Perhaps a pocket electroscope would help."

PHOTOGRAPHING THE SUN OR MOON.—Mr. J. C. O'Loan of Liverpool writes to the *Scientific American* as follows: "While experimenting with a ray of sunlight in a darkened room, I had my attention directed to pinhole pictures, and am of the opinion that startling results can be obtained in photographs of the sun or moon in this way. In a room darkened by blocking up windows with thick paper, make a small hole in the paper with a darning needle, so as to admit a ray of direct sunlight. Hold a piece of paper in the path of the ray, 12 in. from the hole, you will have an image of the sun $\frac{1}{2}$ in. in diameter, at 4 ft. an image of 1 $\frac{1}{2}$ in., and so on. The size of opening used as lens does not alter the size of image at any given distance, but only its sharpness. Say the opening is 1.16 in., and gives a sharp picture at 4 ft., by enlarging the opening to one-eighth, the size of the image at 4 ft. would be still the same, but unsharp, so that the screen or plate must be removed to twice the distance to obtain equal sharpness. In a room 100 ft. long, a 12-in. picture of the sun could be had, and of the moon one very much larger. A series of pipes 100 yards long for camera would give a 3-ft. photograph of the sun. In fact, there is no limit to size of image but the length of camera. Perhaps some one who has more time and space at his disposal than I have may take the subject up."

ARGENTINE.—"Argentine," says *Iron*, is a name given to tin precipitated by galvanic action from its solution. This material is usually obtained by immersing plates of zinc in a solution of tin containing about 90 grains of the metal to the quart. In this way tin scrap can be utilized. To apply the argentine, according to H. P. Marino's process, a bath is prepared from argentine and acid tartrate of potash, rendered insoluble by boric acid. Pyro phosphate of soda, chloride of ammonium, or caustic soda may be substituted for the acid tartrate. The bath being prepared, the objects to be coated are plunged therein, first having been suitably pickled and scoured, and then sub-

jected to the action of an electric current. But a simple immersion is enough. The bath for this must be brought to ebullition, and objects of copper or brass, or coated therewith, may be immersed in it.

THE GREAT ERUPTION AT KRAKATOA.—A report made to the Dutch Indian Government on the character of the memorable volcanic outbreak in the Sunda straits, estimates that the amount of ejected matter from Krakatoa must have been at least ten cubic miles, or to make a range of hills about 1000 feet higher than the surrounding plain. The velocity of ejection was considerably greater than that of the heaviest rifled ordnance, and the ejected material must have reached a height of 30 miles, or six times the height of the highest mountain in the world. The noise of the explosion was heard over one-fourteenth of the earth's surface, and a great atmospheric wave, starting from Krakatoa as its center, spread itself around the world, describing the whole circumference in some 36 hours.

AN ELECTRIC ACTINOMETER.—Messrs. Gony and Rigollet have devised a small battery of peculiar construction that may, according to the *British Journal of Photography*, be used as an actinometer. It is made by heating a clean plate of copper over a Bunsen burner till a layer of cuprous oxide forms; this plate, with one of unaltered copper, forms the battery. A galvanometer is introduced into the circuit and the battery then exposed. The effect is instantaneous, and disappears when the light is cut off. Diffused daylight produces an alteration of several hundredths of a volt, direct sunlight an alteration of at least a tenth of a volt. It is stated that with a Thompson galvanometer it is possible to recognize the effect of a candle flame at a distance of several yards.

A NEW METHOD OF PREPARING SILICON.—H. W. Warren suspends small bars of ferro-silicon immersed in dilute sulphuric acid from the positive pole of a battery, and resting upon a platinum plate that forms the negative pole. After solution of the iron, the residue consists of graphite, silica and amorphous silicon; this residue is heated to redness in carbon dioxide, and then to bright redness in a closed iron tube with zinc. The silicon is dissolved by the zinc, and is obtained in crystals when the zinc is treated with hydrochloric acid. If aluminium be used instead of zinc, and the temperature raised to whiteness, graphitoid silicon is obtained.

HOW IT WAS SETTLED.—The question as to whether the upper part of the wheel of a vehicle in motion travels faster than the lower part has been settled by instantaneous photography, in experiments made by S. W. Gardner. Mr. Gardner takes the photograph of an omnibus en route, and in this photograph, while the lower ends of the spokes immediately adjacent to the ground are not perceptibly unsharp by the motion, the tops of the upper spokes show an angular motion corresponding to about 10 degrees. The photograph most successfully expresses the fact that the wheel it represents is in rapid motion.—*Exchange.*

AN INTERESTING FACT.—A boat may be pierced in several places below the water line, and yet continue to float indefinitely, so long as a swift motion through the water is kept up. This was recently proven by an interesting experiment tried by the English builders, Thornycroft & Co., with a new boat. For the purpose of making the experiment a three-quarter-inch hole was bored into the side, about one foot under water. When the boat was at rest the water flowed in very rapidly, but when moving at a speed of about ten miles an hour a skin of water was drawn over the hole, which resisted any inflow.

A NEW LAMP FOR SHIPS.—A Perthshire inventive genius has produced a new lamp. It is a cross between a candle and a paraffine lamp, but it has all the advantages and none of the defects of either. There is no fear of explosion or of flooding the place with oil (in case of breakage), and there is no waste. The way the wax is kept liquid round the wick is so ingenious that it has been patented, and a company has bought it. It is having a great sale among ship-owners, to whom its qualities are especially valuable.

AN ELECTRO-MAGNETIC PIANO.—Dr. Eisenmann of Berlin has invented a piano which, by the aid of electro-magnetism, can sustain, increase and diminish sound. This has been attempted by other experts, notably Boehm, the inventor of the metal flute. Another novelty will be that, by moving the electro-magnets, the timbre of the tone is changed; for example, from that of a violoncello to piccolo.

TO FIX PENCIL DRAWINGS.—First pass the drawing through clear water, go carefully over with skimmed milk, using a camel's-hair pencil, dip in a weak solution of alum, and let it dry flat. Allow a thin solution of isinglass to run over the drawing on perfectly level surface.

ONYX.—The Mexican marble, which we know as Mexican onyx, is not onyx at all. Onyx is an agate consisting of parallel layers of chalcedony. Marble is a carbonate of lime.

THE SHELLS of all crustacea get red when boiled; those from salt water more than those from fresh. The result is the same, whether the animal is in the shell or not.

USEFUL INFORMATION.

A Lake of Volcanic Glass.

At a point in New Mexico, about 100 miles north of El Paso, there is a lake of molten, black volcanic glass, which seems to have been agitated at the moment of cooling into ragged waves of fantastic shapes. These lava waves or ridges are from 10 to 12 feet high with combing crests. This lava flow is about 40 miles long from northeast to southwest, and from 1 to 10 miles wide. For miles on all sides the country is the most desolate that can be imagined. It has been literally burnt up. It consists of fine white ashes to any depth which, so far, has been dug down.

Ruins of an Ancient City.

A few miles to the north of this lake, or lava overflow, and lying in a country equally desolate and arid, are found the ruins of what was evidently once a great city, now known as the ruins of Gran Quivira. These ruins were well known to the early Spanish explorers, but in later times have been visited by white men less often than the mysterious ruins of Palenque, in Central America. Only a few people at Socorro and White Oaks have been at Gran Quivira, because it is at present 40 miles from water. The ruins consist of gigantic stone buildings built in the most substantial manner, and of grand proportions. One of them was four acres in extent. All indications around the ruins point to the existence here at one time of a dense population. No legend of any kind exists as to how this great city was destroyed, or when it was abandoned. One of the engineers attached to the surveying expedition advances the theory that Gran Quivira was in existence and abundantly supplied with water at the time the terrible volcanic eruption took place which led to its destruction.

A TRADE IN DOGSKINS.—It is well known that in many districts of Manchuria and China there is a great trade in dog and goat skins, which are employed in the manufacture of robes and mats; but it is commonly supposed that the skins are remnants of dirty and filthy animals which abound in those quarters. The idea, however, is a mistake, for the business of rearing dogs for this purpose is as well established and is as systematic an industry as sheep farming. There are countless dog farms scattered over the unknown regions of Manchuria and Mongolia, where from 20 to 100 dogs are reared every year, and where the inhabitant is esteemed according to the number of dogskins in his possession. It is probable that the most beautiful dogs are to be found in these countries, for the exceedingly low temperature of winter, where the thermometer falls to 30° F. below zero, produces a magnificent coat and skin. The prices obtained are, however, very unprofitable, a full-sized robe 80 inches square containing the skins of eight animals, being quoted at 14s. 6d. The value of the trade from Newchwang last year is stated at £40,000.

HORSES ON SNOWSHOES.—Snowshoes have been worn for years by horses on the Orville & Quincy mail route during the winter months. It would be impossible for them to travel over the deep snow without their aid. A horse that is accustomed to wearing them will travel five and six miles an hour, where it would be impossible to go that distance in a week without them. The shoes are made of thin steel plate, about 9x11 inches, fastened on the hoofs with clamps. The horses are shod with long heel calks which go through the snowshoes, and prevent their slipping going up and down hill.

CLEANING ZINC.—The following is recommended by an English writer for cleaning zinc: Clean off all old paint, and apply the following mixture: In 60 parts of water dissolve one part chloride of copper, one part nitrate of copper, one part cal-ammoniac, and one part hydrochloric acid. Rub the zinc over with this, which gives it a deep black; leave it to dry until next day, and it is then ready for painting. The heat paint to use is Becket's prepared varnish paint, which cannot be surpassed for tenacity and durability.

VULCANIZED FIBER FOR COGS.—Vulcanized fiber for mechanical purposes has for some time attracted attention. As a material for cogs, where the moisture from ordinary gearing is inconvenient, it has, according to all accounts, given very satisfactory results. In one case gutta-percha cogs are known to have been used for 20 years. When the wheels became worn, the material was utilized for casting fresh ones. The fact that cogs made of this material are almost noiseless, adds materially to their value.

STOUT CAR HORSES.—Fifteen miles a day is the average distance traveled by each horse of the Dry Dock railway, Philadelphia, and the average working life of the horses is about five years. The horses weigh from 1000 to 1200 pounds. The heavier horses are driven on the one-horse care, and it is found that the horses working singly, as a rule, last longer than those in double teams. They are not as likely to be fretted and annoyed by being cramped as the team horses are.

THE WAY TO GET RID OF TATTOO MARKS.—M. Varinot gives a method of getting rid of tat-

too marks, which causes but little pain and leaves no deformity. He simply punctures the skin over the mark with fine needles, and introduces a little tannin, and then touches the parts with a strong solution of nitrate of silver; this forms a tannate of silver scab that falls off soon and the mark goes away with it.

OUR RICE PRODUCTION.—Before the war we exported over 20 per cent of our rice crop; to-day we have to import rice from China. In 1885 the crop in this country was 150,000,000 pounds. The Carolinas, Georgia and Louisiana raise nearly all our rice along the lowlands about the rivers. The yearly consumption per capita in this country is four pounds. England's people eat 10½ pounds each per year.

THE BELL CORD DOOMED.—On all Pennsylvania line trains, unless it is one of the small branches, the bell-cord is gone, and instead of it the air-brake pipes are used to blow a whistle in the locomotive cab. The slightest touch of a delicate wire leading to a valve in the brake system blows the whistle. The Vandalia, as well, has adopted it on most of its trains.

SACCHARINE AND INSECTS.—Dr. Worms of the Paris Academy of Medicine has ascertained that bees, ants and wasps show a marked dislike to the new saccharine. To the human palate there is no difference in the taste between it and sugar. It has been shown, however, that its use disturbs digestion.

WARMING CARS.—The *Railroad Gazette* mentions 24 railroad companies that have definitely adopted some system of heating their cars by steam from the locomotive, and these companies have 2500 cars thus equipped. This is an encouraging sign that the days of the car stove are numbered.

A NEW CARPENTER RULE has been invented by a Boston mechanic. It is of novel construction, and aside from its uses as a rule makes a very handy level or square, in which legs may be adjustably clamped in any desired position.

A PASTE that will harden quickly, stand a great amount of heat and is steam-tight, when hardened is made of asbestos powder stirred into a thick paste with the liquid silicate of soda.

THE managers of a Pittsburg street-car line posted the following placard in their cars: "Whoever expectorates in this car cannot expect to rate as a gentleman."

ROPE TRACES are coming very generally into use for street cars. They are cheap and easily made, and last something over a year.

GOOD HEALTH.

Health of the State.

We have received the monthly circular of the State Board of Health for November. Returns have been received from 63 localities having an estimated population of 654,000. The mortality in those localities during the month was 997—an annual death rate of 18 per thousand, which is above the average for the past six months, but still a very low rate of mortality. Consumption caused 142 deaths. Pneumonia, which in October produced deaths in but 47 cases, in November caused the decrease of 108, or over double the number of the previous month. Congestion of the lungs caused ten deaths. Cholera infantum fell from 30 deaths in October to 12 in November, all of which were sporadic cases. Diphtheria showed an increase, 43 deaths being ascribed to it. Twenty-two of these occurred in San Francisco, six in Los Angeles, and three in Napa, the remainder being scattered throughout the State. Deaths from other diseases were as follows: Croup ten, whooping-cough seven, scarlet fever two, smallpox one, typhoid malarial fever nine, erysipelas three, heart disease six, yone, alcoholism ten. The deaths from cancer reached the very large aggregate of twenty four.

The reports from the different localities show that there was an increase in diphtheria and typhoid fever and a tendency to the spread of smallpox. The meteorological changes during November have increased all acute diseases of the respiratory organs, influenza being epidemic in many places, and pneumonia and bronchitis being quite prevalent.

Referring to deaths from croup and its "twin-sister," diphtheria, the circular says: "The increase in the reports of these diseases must be attributed to sanitary carelessness in the management of the cases occurring. When once diphtheria has arisen, the law of contagion carries it to the rich and the poor without discrimination; to the cleanly and the uncleanly, but not to all alike. Filth fosters the disease, but cleanliness offers no inducement for its propagation. Beware of any person who has a sore throat; do not kiss or absorb the breath of any such. Do not visit the dwelling where diphtheria or croup is present, and above all, do not let your children go where it is. Diphtheria is a preventable disease, and proper sanitary and preventive measures are invariably followed by a limitation of the disorder to the place of its occurrence."

The increase of cases of typhoid fever is attributed to the first rains which always wash

more or less surface impurities into drinking-water. The same cause added to the cold fogs of the season have added much to the frequency of pneumonia. The avoiding of exposure, sanitary care and vigilance are the only means known for preventing these diseases.

ANTI-HYDROPHOBIA.—A Mexican paper says that in the village of Tlaoyapan of Morelos, district of Yautepec, grows a shrub known by the name of Margarita, the mastication of the leaves of which has been discovered to be a radical and instantaneous cure for the hydrophobia. A young woman, named Margarita, was attacked by rabies, made use by chance and for the first time of said leaves, and in her we witnessed this discovery. Afterward there was cured in the same manner her sister, a native of the same town; a daughter of the chief of the hacienda Tenextepango; an individual of Tetxcala, State of Morelos, etc. It would be convenient to make the analysis of this plant that presents such valuable services to humanity and which has been known in many places in Mexico before and since 1870.—*Diario de Centro America.*

[NOTE.—S. H. Gerrish, who translated the above from the Spanish, suggests the query whether the shrub referred to is not the flowering plant of the same which is so common in the gardens of California. If so, it would acquire an almost priceless value. *Quien sabe?*—EDS. RECORD UNION.]

PREVENTION OF SCARLET FEVER.—Sulphur is recommended as a preventive of scarlet fever. I think it might be useful, but the standard specific for that purpose is belladonna in some form, allopathic or homeopathic. The latter form is easier to manage with children, as it can be given in sugar pills. Belladonna fulfills three purposes. It is a preventive. In a case where the attack of fever is inevitable and cannot be prevented, it is then a preparative and palliative, mitigating the severity and danger of the attack when it comes. It is also a specific remedy for the disease. As soon as it is suspected that a child has been exposed to scarlet fever, four or six belladonna sugar pills, such as are used for homeopathic medicines, should be given morning and evening until the time is passed when the disease should have appeared. If one prefers allopathic treatment, let him not fail to obtain directions from a physician as to the dose to be given. The remedy should not be used carelessly and unadvisedly, but it is the specific for scarlet fever, whether the object sought is prevention, mitigation, cure or avoidance of unfortunate after-effects, such as affections of the ear or eye.—*J. P. Robinson.*

ELECTRICITY FOR YELLOW FEVER.—A Kentucky physician suggests the following cure for yellow fever, claiming that the poison in the air is so delicate and subtle that it can be dissipated by strong light: "If this is a fact," says the doctor in a communication to Surgeon-General Hamilton, "I am of the opinion that if a row of large army tents were spread along the center of some street in Jacksonville for the inhabitants to take refuge in, after having been thoroughly disinfected, with a sufficient number of electric lights arranged near the ground on either side of them (the wires, of course, being well grounded), that the lights could be made so intense as to repress the poison and stay the destroyer."

OIL OF BAY VS. FLIES.—It is stated that expressed oil of bay (*huile de laurier*) is extensively used in Switzerland by butchers to keep their shops free from flies, and that after a coat of oil has been applied to the walls none of these troublesome pests venture to put in an appearance. This remedy has also been tried and found effectual in the south of France in preserving gilt frames, chandeliers, etc., from becoming soiled. It is even remarked that flies soon avoid the rooms where this application has been employed.—*American Druggist.*

WATER AND OBESITY.—A physician of Erlangen, Dr. Lorenzen, experimented with himself for the purpose of seeing the effects of imbibition of water upon the bodily weight. For four years he indulged in the not ascetic task of drinking two gallons of beer daily, and discovered the remarkable fact that he had increased his weight 78 pounds. On stopping the ingestion of water (beer) he reduced his weight 14 pounds in seven days. Dr. Lorenzen's experiments are being performed daily by a large class of our esteemed Teutonic citizens.—*Medical Record.*

ONE PROBABLE CAUSE OF LEFT HANDEDNESS. A French physician, Dr. Felz, mentions a curious apparent cause of left-handedness. A child in a certain family was left-handed, and the second appeared to be so at the age of one year. It was then learned that the mother always carried her children on her left arm. She was advised to change, and, held on her other arm, the infant, having its right hand free to grasp objects, soon became right-handed.

TOBACCO SMOKE AND DISEASE GERMS.—Dr. Vincenzo Tassinari of Pisa has been making experiments to ascertain whether tobacco smoke exerts any influence on the development of disease germs. He is stated to have found that certain bacilli are retarded three or four days when exposed to the smoke of the cigar, while the germs of cholera and typhus are entirely destroyed by it.

ENGINEERING NOTES.

De Lesseps Still on the Ragged Edge.

The telegraph a few days ago reported that an American syndicate had been formed to take the work of the Panama canal off the hands of De Lesseps and complete it at once with American capital.

Directly upon the heels of that rumor, and, no doubt, actuated by it, came a report that the French Government would step in and do the work.

That rumor had scarcely been called when word came over the wires that a scene of great excitement had just been enacted at the office of the company in Paris. De Lesseps suddenly appeared at the office and, mounting a table, exultingly said: "My friends, the subscription is safe. Our adversaries are confounded. You have saved yourselves by your own exertions. The canal is made." Here De Lesseps was so much overcome that he burst into tears. Amid cheering and weeping all present shook hands with the famous engineer and congratulated him on his triumph. He had been informed that 410,000 bonds had been taken by the people of Paris and about as many more outside the city—making a total of 800,000.

Then again, the very next day, Dec. 13th, came the news that the bright hopes of the day before had vanished, and all was again in the dark. Another exciting meeting had been held at the company's office, at which, on a call for De Lesseps, his son appeared and announced that only 180,000 bonds in all had been subscribed for, and that the company would, therefore, begin returning the deposits the next day. Referring to his father's remark of the previous day, he said: "My father is younger in spirit than I am. His remarks were made on the strength of a hopeful report that I made him. The result is bankruptcy or the winding up of the company." He urged them to petition the Government to come to the assistance of the company.

Such is the condition of this great enterprise as we write. What a day may bring forth in this curiously developing work no man can tell.

In regard to the last resort proposed—a petition to the French Government to come to the assistance of the enterprise—a contemporary remarks as follows:

When De Lesseps organized his French company he was informed of the points of what we Americans call the Monroe doctrine. In other words, he was told that so long as his company remained strictly a private company, asking no special favors of the French Government and incurring no obligation which would warrant that Government in assuming a protectorate over the canal, there would be no obstacle offered to his enterprise from this quarter. But he was also informed that the United States would not permit a European power to exercise ordinary Government powers over the canal.

The affairs of the canal have reached the crisis that was at that time looked forward to. The canal has absorbed three times the amount of money it was estimated to cost, and is not yet half finished. It has been pretty certain for a year that M. De Lesseps could not get the required sum for its completion from private sources. He was reduced to the alternative of handing the work over to the Government, or of borrowing money on the credit of the Government to an extent which would warrant the Government in assuming control of the canal. The difficulty in the way of either course is that both are in conflict with the assurance M. De Lesseps made to our Government when he organized his company. Large as the expenditures of the De Lesseps Company are, they are insignificant in comparison with the interests involved in the maintenance of the Monroe doctrine. M. De Lesseps has learned that the Monroe doctrine was in force and that his operations must be kept within its requirements. The individual of average wisdom is reluctant to hny into a lawsuit, so we may assume that a Government will exercise a like precaution in huying into a war. The American people have the most kindly feeling for the French, but they cannot waive the Monroe doctrine on sentimental considerations.

THE SWEDEN-DENMARK TUNNEL.—The fate of the railway tunnel between Denmark and Sweden has practically been decided, the joint Swedish-Danish Commission appointed to report upon the project having recommended its rejection, at all events in its present form. The proposal for a tunnel was made by a syndicate of French financiers, and provided for a railway tunnel from a point in the island of Amager, near Copenhagen, to a point near Malmo, on the Swedish coast, the applicants for the concession maintaining that such a connecting link between the railway systems of Denmark and Sweden could not fail to develop the traffic between the two countries.

SETTLEMENT OF BRIDGE PIERS.—A curious case of the settlement of the pier of a bridge is reported from Knin in Austria, where the abutments of the Orzavica bridge have sunk a depth of 20 feet in the river-bed since 1886. As the settlement progressed, the masonry of the bridge was built up correspondingly so as to maintain the same road level. The settlement has now entirely ceased and no further trouble is anticipated.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

AMADOR.

AMADOR GOLD MINE.—*Ledger*, Dec. 8: This company's mine is about 1½ miles south of Jackson on the Mother Lode of gold quartz, on which many of the best mines in the State are located. The mill is about half a mile down Hunt's gulch below the mine. The county surveyor is now at work locating the route for a tramway to connect mill with mine. Shaft No. 1 is 280 feet deep, shaft No. 2, 91 feet deep, shaft No. 3, 328 feet deep, south drift connecting shaft No. 1 and 3 is 380 feet; west crosscut from shaft 1, 458 feet; east crosscut, 9 feet; north drift from east crosscut is in 99 feet; south drift on west ledge crosscut is in 51 feet; south drift at shaft No. 3, 37 feet, west crosscut from shaft 3, 152 feet; north drift on west ledge from west crosscut 3 feet; upraise from west crosscut up 73 feet, intending to connect with bottom of shaft No. 2. A large ore bin is cut out at shaft 3 on the 250-foot station, and preparations generally throughout the mine are being made to take out ore to keep 60 stamps pounding away. A fine air-compressor of the National pattern runs four drills in different parts of the mine. The machinery is all run by water-power from the Amador canal, under a pressure of 165 feet. The mill will also be run by water-power from the same canal, but under 300 feet head or pressure. Mill will be supplied with the Gates ore crusher No. 5, or with two No. 3's. J. B. White & Co., the mill builders, say the mill will work 4 to 4½ tons of ore per stamp each day. The mill will have 24 Frue concentrators, which are considered best for this kind of ore. The mill is well under way, the building and batteries all up, and nearly all the heavy machinery on the ground ready to go in. The building is 108 feet long, 90 odd feet wide, and the high including ore crusher is 88 feet, and is of the most substantial character. The superintendent says he can deliver the ore from the mine to the mill for 5 cents a ton. The company is now getting up large hoisting and pumping machinery to put on shaft No. 3, when the present works on shaft 3 will be taken to shaft 2. The Pelton water-wheels are the kind used by the company.

NORTH STAR.—*Ledger*, Dec. 15: This property is reported as looking more encouraging than ever. The rich seam was broken into a few days ago, and the rock extracted proved fully as rich as any heretofore taken out. A most promising feature is that black gouge is met with. This has until lately been entirely wanting, and the fact that it now begins to make its appearance is accepted as additional evidence that the ore-body will eventually open out to a large and permanent ledge. It has been decided upon to sink another 100 feet and see how the ore-body appears at that depth.

GRAINGER.—Preparations are being made at this mine near Pine Grove to stope out 100 tons or more for crushing. The shaft is now 80 feet deep and a level has been run on the ledge 50 feet, proving the ore to be apparently of as good quality as that which was milled last summer. The vein is from a few inches in width to two feet, and is not frozen to the walls. The gold is distributed very evenly through the ledge, and occasionally pieces of quartz are found showing the free metal. The first crushing yielded at the rate of \$27 per ton, and some was put through an arastra. All the quartz so treated came from the shaft when it had reached 40 feet in depth, and the total product was \$522. At the Tripp and Littlefield mine above Big Bar Bridge the carpenters have the building about finished. The mortar blocks are in and the machinery on the ground ready to be put together. The mill will be very complete, excepting concentrators, as the management has decided not to put in any at present. The power will be furnished by the river water falling over a turbine wheel. Ginocchio Bros. have started up their mill at the Valparaiso. There was a large pile of concentrated sands from ore crushed last spring and when the mill is not running these sands are treated on two Frue machines for the sulphurets they contain. So far there are about 15 tons saved. They have a quantity of picked metal, much richer than that ordinarily milled. After the heavy gold is extracted the tailings will be run into a tank and allowed to settle. It is then ready to sack up for the furnace. We are informed that within the last few weeks 56 pounds of quartz was taken out of the Keystone, from which \$5000 in gold was obtained. The McKenzie Bros. are setting up two Frue concentrators at their mine at Irish-town, and will start the mill as soon as they can get water. There is a streak of sulphuret ore in the mine, said to assay well. A Frenchman named Sellier has allowed a bond on the Dane mine and mill near Pine Grove to lapse, where some prospecting was done during the summer. The property belongs to L. Cassinelli & Bro. of Volcano. Col. W. T. Robinson is plodding along with his scheme to incorporate and work the Alpi gold mine on the same claim as the North Star. His subscription list shows 48,000 shares spoken for, out of a total of 100,000.

Calaveras.

THE GOLDEN EAGLE.—*County Record*, Dec. 13: The Golden Eagle, situated two miles from Angels, in the famous Albany Flat district, bids fair to become a mine of no mean importance. The proprietors, Swartz & Gergens, are jubilant over the fine developments that have rewarded their labors. The shaft is only 50 feet in depth, showing a magnificent ledge 12 feet in width. The rock is very rich in sulphurets and carries free gold. Mining experts claim that the character of the rock at the present indicates a promising mine.

WILLIAMS RANCH.—The mines in and in proximity to Williams Ranch are receiving the attention of prospectors. That is a pocket region. Some rich and beautiful specimens have been taken out from time to time in that locality. A company working on the May Flower, two miles west of Murphy's, are so pleased with the developments that they have gone to San Francisco to make arrangements to place an engine on their claim for pumping and hoisting.

Fresno.

COARSE-GOLD GULCH.—*Cor. Fresno Expositor*, Dec. 6: On the North Side are situated the Lang

& McClellan groups of mines, composed of the Hawkeye, Laura May and the Burney. The first two named are bullion-producers; about 1500 tons from the first and 300 from the second have been milled. The five-stamp mill through which the ore was put had no facilities for saving the sulphurets, and nothing but the free gold was saved, and although this left a handsome profit it was deemed too wasteful, as the sulphurets were increasing as depth was attained. It was then determined to fully develop the several mines, so as to ascertain the capacity and kind of machinery required in a new mill for saving the gold. A shaft was then sunk on the Burney, a location made north of the Texas Flat mine, and on the same lode following this vein, and in ore all the way to a depth of 160 feet, at which point considerable water was encountered, which prevented their crosscutting to the hanging-wall for the purpose of ascertaining the width of the ore body. Good assays in gold were obtained throughout, some of them going over \$700 per ton, but being almost exclusively sulphuret ore. This was so encouraging that the owners, in connection with Charles Melville, on the same vein or lode, 1500 feet further north (the ground between being owned by P. B. Donahoe), have within the last 12 months run a tunnel on this along the foot-wall of the ledge over 500 feet, at which point they ran a cut across the ore body and found it 70 feet in width. Samples have been taken from all portions of the cut, and gold is found in all of it. The very lowest assay obtained went \$2.50 per ton and the highest \$200. The ore is similar in appearance to the Burney. They have since extended the tunnel 40 feet further along the edge of the ore body, the quartz or ore improving, and no symptoms of diminution in quantity. This mine is called the County View, and when properly equipped with milling facilities will be the most important in this portion of the State. Belonging to this series of mines is the Texas Flat, owned by Haggin & Hearst, aggregating some 6000 feet, upon which has been sunk a shaft 500 feet in depth, and a 1000-foot tunnel has been run, developing a vein of quartz varying in width from three feet to thirteen, with sulphureted ores of the same character as the Burney and County View. Preparations to build a mill for this property have been begun and a portion of the lumber brought to the site. Another promising prospect adjacent to the Lang group is owned by J. S. Lingo; vein from two to six feet in width; paying by milling process \$20 per ton in free gold; carries a high per cent of sulphurets which assay into the thousands. On the north of this is situated the Nob Hill, discovered by Charles Ward some 18 months since, and now owned by White & Co. The ore from this is very rich. They have been working steadily. The Lady Ellen is an old location, and has been mined along its surface at intervals for the past 20 years. The ore has been worked by both mills and arastras, and has made an average of \$12 per ton in free gold. None of the sulphurets have been saved. The vein is from three to four feet in width, with deepest workings only 40 feet. And last, but not least, is the Flying Dutchman, owned by Samuel Giles and John Krohn, on the bluff overlooking the Fresno river, at an elevation of about 600 feet above it. A shaft has been sunk 100 feet and a level run from the bottom of it 100 feet, developing a five-foot vein of heavily sulphureted ore, samples of which gave from \$2.50 to \$70 per ton in free gold, the sulphurets assaying over \$150 per ton. The Last Chance, owned by McKenzie & Rule, about four miles southeast of John Krohn's hotel, is equipped with a good ten-stamp mill, and lately they have added to it two Frue concentrators. But it needs two more to do the work required. It has been a steady bullion-producer for the last five years. The mill is now steadily running on ore that will average over \$30 per ton, and they have enough of that kind uncovered to keep them going several months yet.

Mariposa.

WHITLOCKS AND SHERLOCKS.—*Mariposa Gazette*, Dec. 15: On Sunday last we visited the Whitlock and Sherlocks country, and saw a few of the mines of that vicinity. The little two-stamp mill of Ellingham & Groves was pounding away vigorously crushing beautiful looking rock from the mine of the Helm Brothers. Judging from the samples we saw from this mine, it is certainly a rich one. This little mill is of great benefit to the different mines of that region, and has, we understand, ground out over 200,000 in the few months it has been planted there. That entire section abounds in rich veins and good placer claims, and more mills would be kept busy could plenty of water always be had. We visited Capt. Diltz mine and saw the preparations he was making for winter, making and repairing flumes, and putting things in order. Lack of water alone prevents him from uncovering the wonderful strata which form the entire mountain on which his mine is situated.

MARIPOSA ESTATE.—James Cross, superintendent of the Mariposa estate, was in Mariposa on Thursday last. He speaks encouragingly of the prospects at the Pine Tree mine. They have a vein now in the face of the north drift, seven feet in thickness, which shows free gold and yields satisfactory prospects. Mr. Cross has no hesitation in saying that it is the purpose of the owners to fence the entire grant.

GRANITE SPRINGS.—Report has it that Messrs. Barfield, McSwain & Varain are taking out very rich rock from their recent purchase here. The Mignonne mine and mill are running a full crew of hands, under the superintendence of Mr. Larkin of Snelling. This mill has been idle for some time for want of water to run it.

POCKET.—It is rumored that Mr. Samuel Carr of Hornitos struck a rich pocket in his mine a few days ago.

Napa.

MINING NEAR CALISTOGA.—Work in the Palisade mine and reduction works continues right along, and shipments of bullion are regularly made. Everything is running smoothly at the works, and ore is being taken from the mine as fast as needed for the stamps. For this purpose stoping is being done, though in this sort of work only a beginning has been made. The mine has two ore veins, and years will be required to exhaust the supply; in fact, years will be necessary to reduce the ore now in sight. We are somewhat surprised that more attention is not paid to prospecting in this vicinity, particularly by mining men from abroad who are throwing away thousands of dollars in districts far less promising than this one is. Outside of the Palisade mine there is little labor being done, the main exception being

the Calistoga Consolidated property, where Dr. Smith is superintending the work of prospecting, the drift in rock toward the vein now being in 70 feet or more. This is the property upon which a shaft was sunk a few months ago, work being suspended on account of a strong flow of water being encountered by cutting into the side of the vein. The drift in which work is progressing will cut the vein many feet below the bottom of the shaft in question, and also drain the ground for such prospecting as may thereafter be deemed necessary. The company has strong hopes that the Calistoga Consolidated will make mine No. 2 in this district. San Francisco parties are interested in it. We have many times called the attention of men in this vicinity to the fact that some of their spare time might be profitably devoted to prospecting.

Nevada.

THE WASHINGTON.—*Transcript*, Dec. 12: Superintendent Tregido of the Washington mine, at Ormonde, is in town. Underground operations at the mine are being steadily pushed and the ledge looks better than it ever did before. It has widened to 16 feet in the face and is of excellent quality. The main tunnel is to be pushed along the ledge into the heart of the mountain and crosscuts will be made so as to fully develop all the valuable ore deposits. In the spring the mill will be started again. The cold weather in that locality prevents successful crushing during the winter months with the facilities now at hand, but by next winter a series of furnaces will be constructed in and around the mill so as to maintain a uniform temperature of the water used in the batteries and on the overshot wheel which furnishes the power for the machinery.

A PAYING MINE.—The Nevswest mine at Willow valley in this township is paying largely. Nine tons of ore sent below for reduction paid nearly \$300 a ton gross, giving the owners over \$250 a ton besides cost of shipment and milling. Forty-five tons of ore recently taken from this mine paid an average of \$700 a ton. The Nevswest is owned by a company of practical miners who do their own work and have shown great pluck and perseverance in staying by and developing it despite many difficulties and discouragements. The owners of this valuable property are Elisha Hampton, John Goynne, J. J. Lyons and George True.

HARTERY MINE.—*Grass Valley Union*, Dec. 13: The Hartery mine, owned by Edward McLaughlin, of San Jose, and Wm. Loutzenheiser, has been bonded to A. W. Stoddard. The negotiations have been in progress for some time and have just been completed. The bond is for the term of three years, at the end of which time Mr. Stoddard has the option of its purchase at \$40,000, in the meanwhile paying a royalty of ten per cent from the product of the ore extracted. He will commence operations upon the mine without delay. The Hartery is well located in the group of mines in the southern part of the district that have been large producers, such as the Allison Ranch, New York Hill, North Star and Omaha, all of which are near by, and the two last named now in successful operation. With proper development there is no doubt that the Hartery will prove a good mine.

GRASS VALLEY.—Grass Valley is the boss quartz mining district of the State, and is becoming better all the time. Good wages are paid, none but white men are employed, and strikes are never thought of or threatened.

Placer.

MORNING STAR.—*Grass Valley Union*, Dec. 13: The Morning Star gravel mine, near Iowa Hill, is showing up well, although the mill has not been able to run much for months, owing to the limited supply of water. The last run made just before Thanksgiving day, of 35 bours, gave a yield of \$1700, paying all current bills and giving a dividend of 50 cents a share besides. The drift along the gravel channel, which was started from an upraise of 25 feet above the tunnel level, has prospected finely, and paid well the entire distance. Of late the bedrock has been pitching, and the water has become so troublesome that it has been determined to drive the main tunnel ahead for the purpose of bottoming the channel. With this purpose in view a contract has been let at the price of \$9 per foot. As the width of the gravel channel has never been ascertained, a T drift is to be run directly across it, and the gravel that will be drained by this work will be mined out until such time as the main tunnel reaches the low point of the channel that cannot now be worked on account of the water. The claim is evidently rich, as the gravel generally pays \$12 to the carload, and even \$20 to the pan has been taken out. There is a large extent of ground to be worked. J. H. Neff of Colfax is the superintendent of the Morning Star.

NEW MILL.—*Placer Republican*, Dec. 12: The new 20-stamp mill of the May Flower mine is completed and was started up yesterday. This new mill is called one of the best in the State. There is a self-feeder with each set of five stamps, and a Eureka rubber in front of the apron of each five stamps. At present the machinery is run by a 75-horse power engine. The boiler is 16 feet long and 54 inches in diameter. The mill is also equipped with a five-foot Pelton wheel so that the stamps may be run either by steam or water. A 22-inch pipe brings water to the wheel from the new Union ditch. The pressure is 440 feet. The machinery is placed in such a way that water alone may be used when there is the necessary quantity, or steam can be used alone if there is no water; or water and steam combined may be used if found advantageous at any time. Everything at the mine is looking very well.

LIVE OAK.—The Live Oak mine near Forest Hill is still prospecting, and for the last two weeks it has looked encouraging. A drift of 200 feet has been run in the bedrock, and an upraise of 37 feet at the end of the drift shows indications of a new channel which they are now trying to cross by a crosscut. So far the bedrock has pitched eight feet in each 12 feet of drift. The signs are good—blue cement and blue gravel.

Trinity.

EAST FORK ITEMS.—*Journal*, Dec. 8: Capt. Truworth of East Fork was in town this week and gives us the following items in regard to that camp: He is working eight men on the North Star mine, taking out ore and running tunnels. The ledge in the North Star proper is four feet wide and carries free gold and sulphurets. With this property are three more ledges, varying from 18 inches to 4 feet in width. A five-stamp water-power mill, with a

capacity of three tons a day, is now running; an ore-feeder and rock-breaker, which will be put on, will increase the capacity to five tons a day. A concentrator will also be put on to save the sulphurets. This mine will prove a valuable property; a number of experts who have visited it the past summer speak highly of it. It only needs increased crushing capacity to become one of the finest properties in the district. Capt. Truworth will start an arastra this week, crushing ore from mines on Barney gulch. He has 600 tons of ore from the various ledges in which he is interested, ready to be crushed. In the Belle mine a tunnel has been run and the lead stripped 150 feet; there are 200 tons of good ore on the dump. The prospects are good for a high-paying mine. W. T. Garratt of San Francisco is interested in this property. Four men are now working on the Fountain Head, driving tunnels and stripping the larger lead, which is now exposed 250 feet; the second ledge of the mine is one foot and the third eight inches in width; all carry free gold and sulphurets. On the Thanksgiving, which adjoins the Fountain Head, over 500 feet of tunnels have been run and men will be put on to still further develop it; the ore will pay well to mill. Several hundred dollars have been laid out on the Grizzly in the way of development work and the mine is showing up well. The Simmons Bros. are at work on the Web Foot, running tunnels and taking out ore; they talk of putting up an arastra to crush their ore; they have 50 or 60 tons of ore on the dump. Every arastra and two mills are now running in the district and considerable bullion will be produced there this winter. A 10-stamp mill is on the way, which is to be set to work on \$100-rock. There are 75 or 80 men in camp now, and another season will double the number. The prospects of the camp are wonderfully good, and another season will see it take giant steps forward.

NEVADA.

Washoe District.

YELLOW JACKET.—*Enterprise*, Dec. 15: Work has been resumed and ore is again being shipped to the Santiago mill.

BULLION.—All work again going on as usual.

CON. IMPERIAL.—The repair work on the 1100 level is still in progress.

CHALLENGE CON.—During the past week 200 tons of ore have been extracted and sent to the Brunswick mill. The average assay value of this ore was \$32.95 a ton.

CONFIDENCE.—The usual amount of ore is being taken out and shipped to the Brunswick mill.

BALTIMORE.—The usual amount of prospecting work is in progress.

CHOLLAR.—The raise from the 650 north drift is in quartz showing value. On the 750 and 850 levels the west drifts are still in clay and quartz. Half the Nevada mill is being run on Chollar ore, the machinery being run by the surface Pelton water-wheel.

CROWN POINT.—Ore of good quality is showing in the raise from crosscut No. 1 on the 700 level. The boxes will all be in place in the drain drift to the Suro tunnel by the end of the present month.

BELCHER.—The north drift on the 200 level is still being advanced in quartz and clay. On the 1100 level the joint Seg. Belcher drift is in vein material carrying some metal.

SEG. BELCHER.—On the 1100 level the joint Belcher drift is in vein material carrying some metal.

JUSTICE.—Work is being continued on the north drift. Are putting in two batteries of five stamps each in the room of the cannon-ball crushers.

ALPHA.—The north lateral drift on the 500 level is still in clay and quartz. The south lateral drift is in ore that assays from \$15 to \$20 a ton.

POTOSI.—The south drift on the 650 level is being advanced in clay and porphyry.

SAVAGE.—The southeast drift on the 400 level is now out 742 feet, and the north drift 165 feet. Both drifts are in promising vein material. The main west drift on the 400 level is making good progress. Are stoping ore from the east crosscut on this level, also from the south drift. On the 600 level are extracting ore from Nos. 2 and 3, east crosscuts, also from the old stopes on the 750 level. During the week have hoisted 491 tons of ore and have shipped to the Rock Point mill 237 tons. Average battery assays, \$20 per ton.

HALE AND NORCROSS.—On the 500 level the main west drift is out 40 feet and is in material that gives fair assays. Are still stoping ore from the body recently discovered on this level, and have extended a drift north 50 feet, following the ore. The face of the drift continues in good ore. On the 600 level the west drift has been extended 40 feet, making its total distance 115 feet. The stopes on this level are looking well and yielding the usual quantity of fair-grade ore. On the 800 level, from the face of the north drift, have started No. 9, east crosscut, which is advanced 35 feet. The face is in quartz and porphyry. Have bullion on hand and previously shipped this month amounting to \$22,400.

GOULD AND CURRY.—On the 200 level the north drift started 100 feet from the top of the upraise from the 300 level has been extended 28 feet; total length, 100 feet; formation, hard porphyry. On the 450 level the west crosscut started 60 feet from the top of the upraise from the 500 level, has been extended 16 feet; total length, 136 feet; formation, porphyry with streaks of quartz. On the 625 level the work of repairing the main south drift is still in progress.

BEST & BELCHER.—On the 300 level the incline winze has been sunk seven feet; total depth, 70 feet. Formation porphyry and quartz, showing some value. In this winze at a point 50 feet below the 300 level a small station has been cut out and an east drift advanced 15 feet, passing through eight feet of ore of fine quality. A north drift started 25 feet west of the winze has been extended 20 feet; total length 50 feet. Formation porphyry, clay and quartz, showing some value.

CON. CAL. & VIRGINIA.—The usual quantity and quality of ore is being extracted from the stopes on the 1400 level. On the 1435 level the north drift from the bottom of the winze continues in ore, and the stopes east of the winze are yielding well. On the 1500 level still stoping ore from the stopes opened out southeasterly from the upraise 58 feet above the track floor of this level. Some ore is still obtained

on the 1600 level from the drift running south from the Ophir. On the 1650 level are stopping out of ore of good quality in a number of places, and are doing a considerable amount of prospecting. On the 1650 level are extracting ore of fair quality from the old stopes in the south end of the mine. During the past week the usual amount of ore has been shipped to mills on the river, and the average of the battery samples will be about the same.

UTAH.—The main west drift on the 600 level is in a favorable formation.

OCCIDENTAL.—The winze down from the upper tunnel level is in a mixture of quartz and porphyry assaying well. The east crosscut from the north drift on the 100 level is in material that carries metal. The winze down from the lower tunnel is yielding ore that pays \$20 a ton.

NORTH OCCIDENTAL.—The north drift from the 400 level of the Occidental is making good headway. The face is showing streaks of good ore.

UNION CON. AND MEXICAN.—On the 1465 level a joint Union drift started from the east drift from the Ophir shaft is in Mexican ground a distance of 246 feet.

OMIHA.—The south drift on the 1465 level is in vein porphyry with many clay seams.

WEST CON. VA. & CAL.—Sinking of the main shaft resumed.

Wild Rose District.

SPRING CITY MINES.—Silver State, Dec. 13: W. B. Todhunter, who has just returned from a trip to Spring City, says he was informed while there that the Paradise Valley and Cliff mines at that place are looking unusually well. They have, he was told, a fine body of ore in the Wild Goose, and he saw wagon-loads of it which seemed to be rich. They have also good ore in the 70 foot and 110 foot levels of the Cliff mine, and the general impression of the miners is that there are large bodies of it.

ARIZONA.

MOHAVE.—Miner, Dec. 8: Supt. Geo. M. Bowers has shut down the Night Hawk mine until the first of the year. More locations will be made on January 1st in Mohave county than in any single year in its history. For the three months ending December 1, 1888, the Arizona Sampling Works at this place paid out for ore, \$85,500. C. E. Sherman reports the Queen Bee at Mineral Park as looking better than ever. A whim will be put up this month and the labor of hoisting lessened. The mill at Cerbat is being put in order by John Barry, and we understand that it has been leased to responsible parties and will be started up at the beginning of the year. There have, during the past week, been several mining experts in town, and several sales of mining property are reported well under way. The Flores G. M. Co. is now taking out a good deal of ore. The ore streak is reported as being four feet wide and working 100 ounces per ton. The mill is running and shipments of bullion are being made. J. F. Luthy leaves this week with several miners to commence work on his gold claim at Salt Springs, near the Colorado river, about 65 miles north of this place. Walter Scott, who is working a mining claim about 15 miles south of Franconia station, is now working four men and is taking out some first-class ore. These claims are located in a district but little prospected heretofore for lack of water. Mr. Scott is the only one who has done any development work to any extent in this district. The recent strike in the Prince George mine at Stockton hill has been worked well up to the dividing line. This property was divided some time ago. Dana & Howell purchased one-half from the owners, Thos. Christie and Caldwell Wright, they retaining the other half. The latter gentlemen were offered this week a goodly sum for their interest, but refused it and will work the mine themselves.

IDAHO.

BEDROCK FLUME.—Idaho World, Dec. 15: Four men are now at work for the Grimes Creek Bedrock Flume Co., putting up buildings for the winter and erecting a blacksmith shop. Winter supplies have been laid in, and as soon as the buildings are up a force of ten men will commence the construction of the flume, which commences in the canyon about a mile below the Big Bend. One hundred or 150 feet of flume 16 feet wide by seven deep will be put in before spring to catch the escaping quicksilver before that is continually passing down with the sand. It is supposed that the flume will carry all of the water of Grimes creek during the spring freshet, but precautions are taken against its raising should it not. The company owns eight claims of 20 acres each, which is abundance of ground for years to come. Superintendent Goldtrap says he intends pushing the flume as rapidly as possible, and hopes to soon have it on a good paying basis. As soon as the flume begins to show good cleanups other companies will be formed to work Ophir, Granite, Elk and More creeks, and placer mining will again be a great industry in Boise Basin.

BRITISH COLUMBIA.

NEW CAMP.—Donald Truth, Dec. 12: Nelson, the new camp in the Toad Mountain country, is about 185 miles from Revelstoke, which is its natural supply point. There is little doubt but that the district will turn out to be one of the richest ever discovered on the Pacific Coast. Hall Bros. are working 16 men, and have expended about \$6000 in erecting boarding and ore houses and in laying in a stock of provisions for the winter. Their ore runs from \$200 to \$240 a ton in silver. J. E. Dolen and Landry Morrow are working a day and night shift on their claims. LeBeau & Co. have four men at work running a tunnel on their claim on Cottonwood Smith creek. King & Snider have bonded four claims, on the same creek, to an English company, who evidently mean business, as they have written to the secretary-treasurer of the Columbia River Transportation Co. for tenders for transporting 12 tons of machinery from the C. P. R. at Revelstoke to the claims, which are situated about five miles south of Nelson. T. M. Ward, at the Kootenay ferry crossing, has several good claims, and is building a large hotel this winter.

OLD CAMP.—At the Hot Springs camp, 30 miles north of Nelson, G. B. Wright has 20 men at work on his No. 1 mine. An assay from an average sam-

ple of the ore taken from the full width of the face of the ledge gave \$500 to the ton. Mr. Wright will run a 300-foot tunnel this winter. He is also building a steamer to ply between his claims and Bonner's Ferry. Mr. Davenport has made a 30-ton shipment from his Little Donald claim, and is now working 10 men. W. Wheeler has 10 or 12 men at work on his great carbonate ledge. The Hendryx Co. is working 20 men, and there are a number of other claims, in both the new and old camps, working from two to four men each. About 150 men will winter in the district.

ORE SHIPMENTS.—This week the Monarch mine at Field shipped live cars of ore to the smelter at Vancouver, making 10 cars in the last two weeks. The shipment will approximate 200 tons. The ore carries about \$26 a ton in silver and a large percentage of lead.

TWENTY-DOLLAR NUGGETS.—Advices, believed to be reliable, come from Rogers Pass that rich placer ground has been worked on the quiet over near the headwaters of the Beaver for the last two years. It is known that nuggets ranging from \$5 to \$20 in value have been taken out. It is claimed that the ground is on a creek whose source is an immense hot spring, and that sluicing can be carried on the year round.

MONTANA.

SHERIDAN.—Inter-Mountain, Dec. 12: Mr. Dave McCranor said yesterday that he was just in receipt of news from Sheridan, stating that a valuable strike had been made by the Bedford Co. in their property on Ramshorn creek, about 12 miles from Sheridan. The Bedford has been under active development for the past six months, and the persistent labor of the company has at last been rewarded by the discovery of a large and rich deposit of lead and silver ore. The find is reported to be such that it will at once place this among the list of paying properties of old Madison county.

HARRIS AND LLOYD.—Work is in progress for the extensive development of this property by the Boston & Montana Co. A new boiler is now being placed in position which will be followed by the erection of a larger hoisting plant. George Tong is having a new boiler made at Maboney's foundry for his Goldsmith mine. The development of the Destroying Angel lode now being made by W. R. Davis & Co. is of the most flattering character. In the prospect shaft which is down only a few feet, rock was taken from it on Saturday which showed assay returns of \$55 in silver and \$5.60 in gold.

AT ANACONDA.—At this place work has not been resumed in full force yet. Part of the Upper Works furnaces have been fired up, but it is expected that the whole plant will be running next week, or as soon as the railroad company can guarantee an unfailing supply of fuel.

NEW MEXICO.

SHERIDAN MILL.—Silver City Enterprise, Dec. 1: Thirty thousand pounds of machinery arrived here last week for the Sheridan mill in the Mogollons. The mill is being remodeled somewhat, and better equipped to handle the ores of that camp. A wire tram will soon connect the mine and the mill. The mill will probably be running by the first of the new year. A shipment of seven or eight tons of ore was made from the Alhambra this week. Nine sacks of ore were shipped by express and were valued at \$3600, which was not considered a high value. E. G. Shields came up from Las Cruces on Saturday, and on Monday visited the Peerless mine. He will soon put a force of men to work on the property, with Sam Hughes of the Organs in charge. Frank Baxter, A. J. Whittington and Mr. Adams have given a four-months' bond on seven claims in the Silver basin, near Morenci, A. T., to Chicago parties, the consideration being \$15,000. The new company has day and night shifts working in two different shafts. General Boyle arrived from St. Louis this week and closed the deal for the Wagner mine, which now belongs to the Deep Down company. A contract has been let to Capt. Terise and Capt. Webb, two well-known miners, for the mining and delivery of 5000 tons of ore at the mill. Wm. Farrish, the gentleman who first placed and opened up the great Carlisle mine of this county, visited Silver City last week, arriving in the evening, and leaving the next morning for the Santa Rita copper mines with Geo. D. Roberts. They returned the same evening and left on the next morning's train. The object of this visit is not definitely known, but it certainly augurs well for the speedy resumption of operations at the Santa Ritas.

CARLISLE.—The net output for the Carlisle for October was \$10,000. About 30 tons of concentrates per day are being made, besides the free gold caught on the plates. About eight tons of concentrates per day are being smelted, the smelter now working as satisfactorily as could be desired. While the smelter is working entirely satisfactory, it is still questionable whether it pays the company better to ship in its fluxes and coke or to ship out all its concentrates. The company has found it advantageous to sever all business connections with the Clifton railroad, and proposes to transport its twenty odd tons of concentrates to Lordsburg daily overland, and has already entered into a contract with freighters to do the work for one year.

UTAH.

DISCOVERIES AT TINTIC.—Salt Lake Tribune, Dec. 13: The past week witnessed some excitement in Tintic over discoveries along Boulder creek, not far from Eureka. These discoveries were of such character as to cause a stampede and the staking of claims all over the country. The small openings so far made show good bodies of lead-silver ores, and there is promise that some of the claims will be developed at once.

THE COMET OPERATIONS.—The Comet Smelting Works Co. is making good progress in erecting a 40-ton water-jacket smelter in Copper gulch, Beaver county. A large force of men is employed and the buildings will soon be inclosed. The machinery is also getting in place so that early in January the works will be in full blast. First-class ore will be smelted, while the low-grade is to be tested by a new leaching process, for which a building is going up in which there will be several tanks, placed in regular steps, so as to drain from one to another. The com-

pany is showing commendable energy in putting their plant in readiness for operating, and Copper gulch gives promise of soon becoming a very active mining and ore-reducing district.

OREGON.

LOOKS LIKE BUSINESS.—Brock Democrat Dec. 13: The Oregon Gold Mining Co., operating the Eureka & Excelsior mines at Cracker creek, has let a contract to Messrs. McEvan & Guthrie, of the Canyon and Baker City Stage Line, to freight into Cracker creek from this city 64,000 pounds of freight, the greater portion of which is machinery for the new mill which the company proposes erecting in the spring. They have also let a contract to the same gentlemen to haul 60,000 pounds of ore to this city for shipment to Denver for reduction. From present appearances the E. & E. Co. intend making every preparation for extensive operations in the spring. This, with the active operations on the Columbia and North Pole mines, will make Cracker creek boom the coming season.

MARKET REPORTS.

Local Market.

SAN FRANCISCO, Dec. 20, 1888.

Business is dull, with no improvement looked for until after the holidays. So far as can be ascertained, the year drawing to a close has been fairly prosperous in all branches, although a few individual complaints are heard. As a rule, merchants and others engaged in business are reported to be easier, financially, at the close of the year than for several years past. The banks report an easy tone to the money market, with no decided call for funds and none looked for until the turn of the year, unless a stock speculation sets in soon. All present indications point to an early bill movement so as to repeat the old trick of unloading on the public at higher prices. The mines whose stocks are listed on the two exchanges are having work of a promising character done, which is likely to give results that can excite a large speculative movement, calculated to draw in outside buyers. The news from the mines is confirmatory that the work in West Con. Virginia is demonstrating that the Red Lode is a true fissure vein. With crosscutting that is to be commenced soon, it is claimed by mining men that a large and valuable ore deposit is likely to be run into. This belief is causing the various west side companies to prepare for active work in their mines. Outside of this the 1465-foot drift in Ophir running into Mexican toward Union is quite important, and it is claimed that with crosscuts run, valuable deposits of ore are likely to be run into. The 1650-foot and 1750-foot levels in Con. Virginia are proving to be very rich in mineral ore. In Hale and Norcross they are in good milling ore over 12 feet wide on the 500-foot level, with the vein increasing in width as it goes toward Savage, having already widened out over 6 feet. In Savage on the 400-foot level they are drifting to the west so as to intersect the ledge found on the 500-foot level of Hale and Norcross. In Best and Belcher work is being pushed forward so as to demonstrate the extent of the late "find." The drift in Con. Imperial is being pushed forward toward Alpha. In Crown Point on the 700-foot level west in the upraise toward the 600-foot level, better ore is found, with the vein growing wider. One of the most important works in the Gold Hill mines is that of having the drain-boxes nearly completed, which will admit of Crown Point and Belcher being opened to the west on the Suro tunnel level, and if it proves to be as rich in mineral as experts claim it will, then pumping will likely be commenced so as to go deeper. In the Quijota, Tuscarora and Bodie districts, news is of about the same tenor as heretofore reported.

SILVER.—The market held firm at unchanged prices up to Tuesday, when lower prices ruled in sympathy with a decline abroad. For shipment by steamer to China, which sailed on last Tuesday, 93c was paid. The steamer took out in bullion, \$309,000 to Hong Kong and \$95,000 to Hio-go. The receipts of silver bullion are not large, but commencing with next month a large increase is looked for, chiefly from the Comstock mines, owing to more mills starting up.

London cables quote silver to-day at 42½@42 5-16 and New York telegrams quote that market at 92½@92¾c. In our market 92½c is bid with no sellers. As the leading mines appear to be worked in the interest of stock manipulators it is quite likely that there will not be any increase in the supply of silver bullion until the insiders buy more stock at a lower range of value than has been reached since last August.

QUICKSILVER.—The demand is quite free from the coast mines. It is said to be larger in this month than in December, 1887. Prices are unchanged, although it is claimed that concessions on our quotations were made by one seller.

LEAD.—The market is barely steady for pig. Eastern advices continue to report free transactions by consumers, but the heavy stock held by the assignees of Cordwith of Chicago is a weak spot in the market.

IRON.—The local market is dull and inactive. Importers are storing rather than to make concessions. For prompt shipment and to arrive, sellers' views are still above buyers', owing to the high prices abroad, and also high freights, although there are signs of the latter weakening.

COPPER.—The market is tending to easier prices. The East reports an inactive and dull market.

BORAX.—The market is steady, with the demand light.

COAL.—The mildness of the winter and the majority of householders having laid in liberal supplies in October, are against house coal, but steam coal is very firm for spot and nearly due, but weak for prompt shipment. The output of the coast collieries is steadily increasing.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Dec. 20, 1888.—The following are the closing prices the past week:

	Silver in	Silver in	Copper.	Lead.	Tin.
Thursday	42 9 16	93	\$17 23	\$8 23	\$1 85
Friday	42 9 10	93	17 50	8 70	21 75
Saturday	42 9 0	93	17 40	8 70	21 70
Sunday	42 9 16	92½	17 00	8 60	22 00
Tuesday	42 10	92 11 16	17 15	8 70	21 80
Wednesday	42½	92 9 16	17 10	8 75	21 80

There is a light demand for quicksilver at 60¢/62c. Late offerings of Lake ingot copper were rejected at \$17.25. There was a small January sale at \$17.85. Consumers' wants are not urgent, and they can obtain a suitable quality at \$16 50. The market abroad is spiritless. The lead is weak with an abundant supply. There were 15 carloads on 'Change, which sold at \$3.70@3.75 for December and January. Outside 700 tons were placed \$3.75 down to \$3.65, deliverable within the next 60 days. Refined petroleum is stronger. Barrels, \$7.20@7.30; plain cases, \$9.30.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on Call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Biliton Tin, \$24.50@—; Banca Tin, \$24.25@24.50; Baltimore Copper, \$15.00@15.50; Orford Copper, \$16.00@16.25; P. S. C. Copper, @—; Foreign Lead, \$4.75@5.00; Foreign Spelt r, \$6.00@6.25; Antimony, \$10.00@13.50.

San Francisco Metal Market.

	WUOLESALE.	THURSDAY, Dec. 20, 1888.
ANTIMONY—French Star	134¢	141
BORAX—Refined	140¢	71
Powdered	140¢	71
Concentrated	62¢	71
COPPER—		
Bolt	26¢	27
Sheet	25¢	—
Ingot	16 90	19 00
Fire Box Sheets	—	25
IRON—Glengarnock ton	—	—
Edison	—	—
American Pig, No. 1, ton	—	32 50
Oregon Pig, ton	—	33 00
Clay Lane White	—	24 50
Shotts, No. 1	—	24 50
Bar Iron (base price) @ lb.	22¢	3
Chrome iron ore, @ ton	8 00	10 00
LEAD—Pig	5 50	—
Bar	11¢	—
Sheet	6¢	—
Pipe	7¢	—
Shot, discount 10% on 500 bags	1 55¢	—
Buck, @ bag	1 75¢	—
Chilled, do	1 35¢	—
Steel—English, B. & F.	16¢	20
Cast iron tool	9¢	—
Black Diamond tool	10¢	16
Pick and Hammer	8¢	10
Machinery	4¢	5
Toe Calk	42¢	—
TINPLATE—Ooke, prompt shipment	4 85¢	4 50
Coke on spot	—	5 15
Charcoal, Hx20	6 75¢	7 25
do roofing, Hx20	5 50¢	5 62
Pig tin, @ lb.	23½¢	25
QUICKSILVER—By the flask	—	42 50
Flasks, new	1 05¢	—
Flasks, old	85¢	—
COKE—English, ton	20 00¢	—

PRICES OF COAL "TO ARRIVE."

	Per Ton.	Per Ton.
Australian	\$10 10	\$11 00 Cardiff
Liverpool Stm	11 00	\$11 50 Lehigh Lump
West Hartley	11 50	\$12 50 Cumberland bkls
Scotch Splint	11 00	\$12 00 Eggar, hard

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. P.) from week to week and year to year.

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The land is just rolling enough to render it beautiful for building sites. Situated at the base of the foothills, it has a most desirable climate, and its proximity to the best Female Seminary in the State makes it suitable as residence property for families having girls to educate whom they wish to have live at home.

The land can now be purchased at a low price, in Lots or Blocks, with the certainty of a quick rise in value.

For investment, it is an opportunity which rarely occurs, as Oakland is rapidly extending in this direction, and must, in the near future, include this land within its limits. This is proved by the fact that in 1860 Oakland had but 1000 people; in 1870, 10,000; in 1880, 30,000; now, 65,000 and growing more rapidly than ever.

People in the interior who desire to educate their children at the State University, in Berkeley, or at schools in Oakland or San Francisco, can establish here a rural home and be constantly with them.

This land was part of the Laundry Farm, that old and well-known Summer Resort, and is just far enough from the Picnic and Camping Grounds to be desirable and add value.

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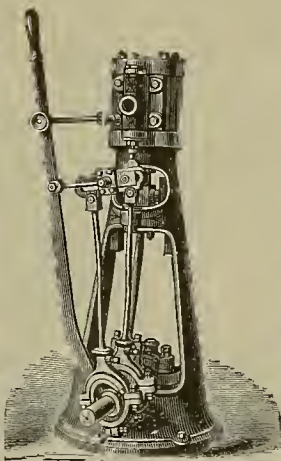
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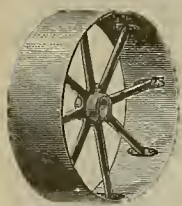
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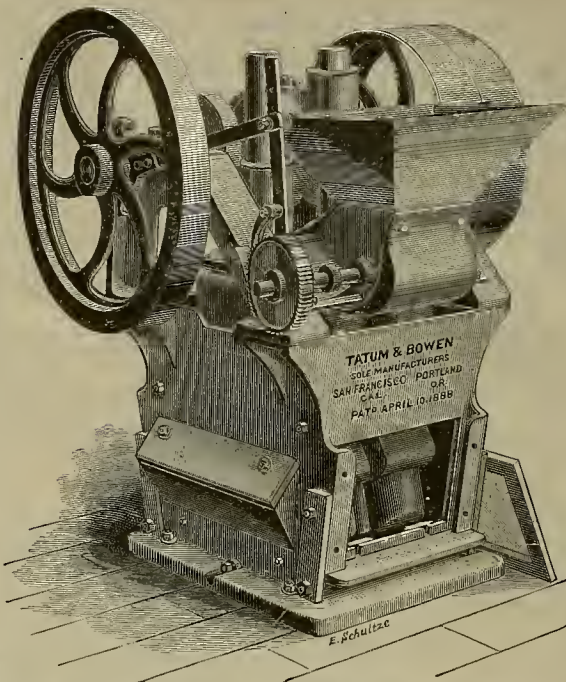
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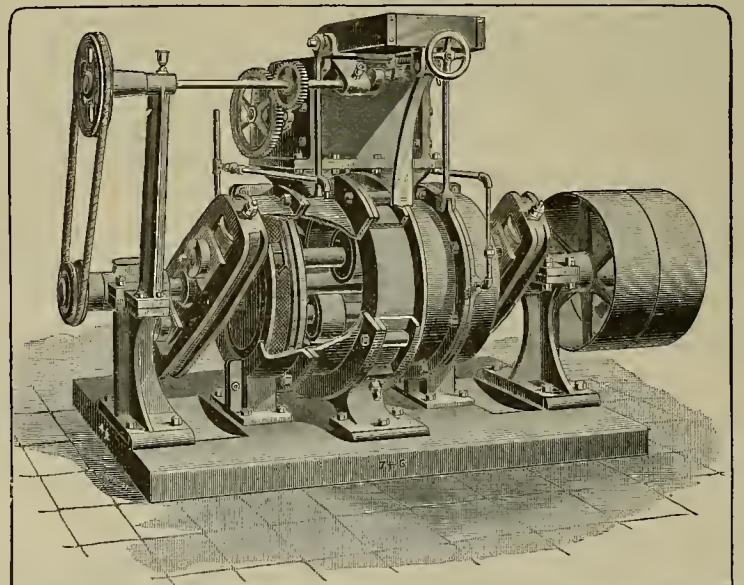
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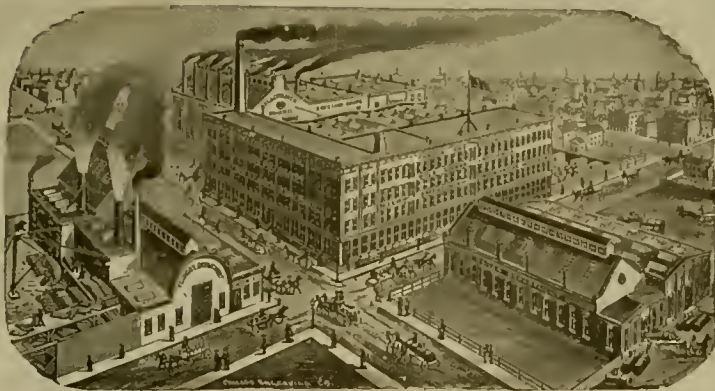
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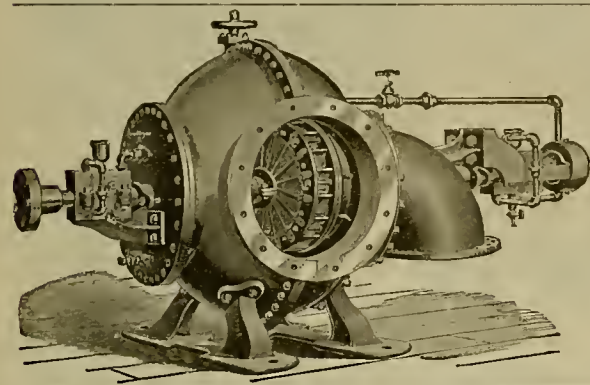
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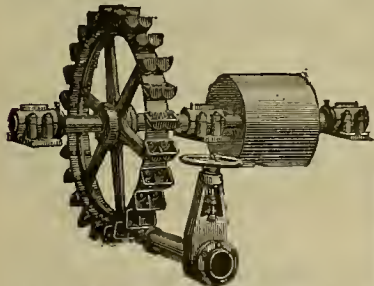
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific States.

From the official report of U. S. Patents in Dewey & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING DEC. 11, 1888.

394,322.—WELL-BORING DEVICE—Geo. Atkinson, Oakland, Cal.

394,152.—FURNACE—J. W. Cassidy, Petaluma, Cal.

394,312.—ERASING SHIELD FOR TYPE WRITERS—Lee D. Craig, S. F.

394,317.—CORN-PLANTER ATTACHMENT—John Fulton, Biggs, Or.

394,353.—PHOTOGRAPHIC CAMERA—W. C. Gibbs, S. F.

394,356.—CABLE GRIP—J. J. Graff, S. F.

394,269.—ROLLER BEARING—R. W. Hunt, S. F.

394,512.—CABLE GRIP—Charles Scholz, S. F.

394,417.—BENCH PLANE—W. Stevenson, Douglas Flat, Cal.

394,314.—STEAM-STEERING GEAR—F. B. Turner, Portland, Or.

394,236.—WINDOW SCREEN—Willard & Wilson, Pasadena, Cal.

NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CABLE RAILWAY GRIP AND CROSSING DEVICE.—J. J. Graff, S. F. No. 394,356. Dated Dec. 11, 1888. This patent covers a cable railway grip and mechanism whereby the grip may be closed and opened, and when open may be raised above the line of a second cable which crosses the first one transversely. The invention is an improvement upon a mechanism for which letters patent were granted to the same inventor July 2, 1888. The present invention relates to certain details in the construction of the gripping mechanism.

BENCH PLANE.—Wm. Stevenson, Douglass Flat, Calaveras county, assignor of one-half to John Monteverde, Stockton. No. 394,411. Dated Dec. 11, 1888. The invention relates to the class of planes in which blades of different character are combined in the same stock; and it consists in the novel stock, the double-ended blades, and their manner of arrangement and means for adjusting them in the stock. The object is to provide a plane of simple construction and which, by reason of its different blades, is adapted for several uses.

WELL-BORING DEVICE.—George Atkinson, Oakland. No. 394,322. Dated Dec. 11, 1888. The excavation is formed of two semi-cylindrical shaped iron scoops having the lower ends tapered and pointed. They are adapted to be opened and closed from above, so as to dig into material in the bottom of the hole, retain said material, and he withdrawn to the surface when the earth is removed.

SPARK-ARRESTER.—Edgar M. Luckett, Sacramento. No. 393,994. Dated Dec. 4, 1888. This improved means for arresting sparks in locomotives consists in the application of a hinged adjustable deflecting-plate and a supplemental netting, in conjunction with a horizontal netting within the extension front or smoke-box of the boiler. The horizontal netting acts first, and the exhaust pipe extending up through it and being surrounded by the cylindrical netting, the latter acts supplementary to the horizontal one, thus providing two checks for the cinders.

MECHANISM FOR OPERATING STATION INDICATORS.—John Knight, S. F., assignor to Pacific Indicator Company. No. 394,074. Dated Dec. 4, 1888. The invention relates to the indicators used in street cars to designate streets or stations and at the same time present to view advertising matter. The invention consists generally in a novel mechanism for operating the indicator, the object being to provide a simple mechanism for transmitting to the indicating apparatus the power derived by contact with a fixed obstruction in the roadway, and yet so modify the power in strength and time of transmission as to render its application noiseless and without suddenness or jar. An air cylinder or air cushion is utilized.

OPERATING STATION INDICATORS.—Benjamin W. Lyon, S. F., assignor to Pacific Indicator Company. No. 394,077. Dated Dec. 4, 1888. This covers an improvement on another patent issued to the same inventor last June. The object of the present invention is to provide a means for moving the rotary disk by which the indicating mechanism on the car is actuated, and to overcome the difficulty which arises when rack and pinion are used for this purpose. When the rack is drawn back so far as to become disengaged from the teeth of the pinion, it is not possible to always secure the proper meshing of the teeth when they come together again. The inventor provides a positively operating device which is not open to the objectionable features of the rack and pinion.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	No.	AMT.	LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Con M Co.	Nevada.	21.	871.	Nov 3.	Dec 8.	Dec 28.	C. E. Elliott.	309 Montgomery St.
Alpha Con M & M Co.	Nevada.	2.	25.	Nov 3.	Dec 8.	Dec 28.	E. E. Elliott.	309 Montgomery St.
Benion Con M Co.	Nevada.	13.	1,000.	Oct 29.	Dec 3.	Dec 24.	Y. B. Allen.	339 Pine St.
Commonwealth Con M Co.	Nevada.	7.	50.	Nov 24.	Dec 28.	Jan 21.	H. Deas.	309 Montgomery St.
Concordia M Co.	Nevada.	2.	50.	Nov 12.	Dec 24.	Jan 12.	G. C. Higgins.	121 Montgomery St.
California State Co.	California.	3.	30.	Dec 15.	Jan 19.	Feb 18.	J. O. Hansome.	10 California St.
St. Western Quicksilver M Co.	Cal.	3.	10.	Nov 23.	Jan 7.	Jan 28.	L. G. Harvey.	313 California St.
Gover M Co.	California.	1.	15.	Nov 23.	Jan 7.	Jan 28.	L. G. Harvey.	13 Fremont St.
Gray Eagle M Co.	Nevada.	10.	05.	Nov 13.	Dec 18.	Jan 8.	O. H. Bogart.	327 Pine St.
Horseshoe Bar Con M Co.	California.	2.	10.	Dec 7.	Jan 14.	Feb 4.	D. M. Kent.	330 Pine St.
Kosuth M Co.	Nevada.	10.	10.	Nov 13.	Dec 24.	Jan 18.	E. F. Flitt.	328 Montgomery St.
Lord of Lorn M Co.	Nevada.	4.	10.	Nov 13.	Dec 24.	Jan 22.	L. G. Harvey.	313 California St.
Live Oak Drift Gravel Co.	California.	10.	05.	Nov 19.	Dec 21.	Jan 16.	J. Morizio.	328 Montgomery St.
Montrose M Co.	Colorado.	1.	11.	Oct 3.	Dec 24.	Jan 23.	F. E. Luty.	330 Pine St.
North Gould & Curry M Co.	Nevada.	10.	10.	Dec 15.	Jan 18.	Feb 4.	C. H. Mason.	331 Montgomery St.
North Star M Co.	Nevada.	4.	20.	Dec 4.	Jan 5.	Jan 24.	D. M. Kent.	330 Pine St.
Russell Reduction & M Co.	California.	6.	05.	Dec 15.	Jan 21.	Feb 12.	J. Morizio.	328 Montgomery St.
Sierra Nevada M Co.	Nevada.	93.	25.	Nov 9.	Dec 13.	Jan 2.	E. L. Parker.	309 Montgomery St.
Seg Belcher & Mides Con M Co.	Nev.	2.	25.	Dec 3.	Jan 7.	Jan 28.	E. B. Holmes.	309 Montgomery St.
Wm Penn M & M Co.	Nevada.	3.	10.	Nov 8.	Dec 17.	Dec 31.	J. J. Scoville.	309 Montgomery St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Combination M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Annual.	Dec 27
Peerless M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Annual.	Dec 27
Peer M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Annual.	Dec 27
Thio M Co.	California.	W. E. Sell.	309 Montgomery St.	Annual.	Dec 27
Weldon M Co.	Arizona.	A. Waterman.	309 Montgomery St.	Annual.	Dec 27

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50.	Oct 11
Confidence S M Co.	Nevada.	A. S. Graham.	309 Montgomery St.	1.00.	Aug 8
Caledonia M Co.	Nevada.	S. Chennaman.	328 Montgomery St.	08.	Nov 25
Candelaria Con M Co.	Mexico.	C. T. Givens.	221 Market St.	50.	Nov 12
Eureka Con M Co.	Nevada.	H. R. P. Hutton.	306 Pine St.	25.	July 9
Peer M & M Co.	Nevada.	R. W. Hunt.	330 Pine St.	25.	Aug 8
North Star M Co.	California.	D. A. Jennings.	401 California St.	25.	Nov 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	309 Montgomery St.	50.	Aug 8
Idaho M Co.	California.	Grass Valley.	50.	Oct 11	
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	230 Montgomery St.	1.00.	Dec 10

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

AMERICAN CHAMPAGNE CO., Dec. 13. Object, to manufacture effervescent liquors. Capital stock, \$250,000. Directors—Gustave Niebaum, Louis Sloss, Jr., Thomas Wilkinson, George W. Sessions, W. P. Willard, David Wood and Benjamin L. Burling.

HATCH-ARMSTRONG FRUIT & NUT CO., Dec. 14. Object, raising nuts, fruits and vines and the manufacture of wines and brandies. Capital stock, \$250,000. Directors—A. T. Hatch, E. F. Armstrong, Elbert Armstrong, Albert Montpelier, and Frank McMullen.

BELLA VISTA VINEYARD CO., Dec. 14. Capital stock, \$20,000. Directors—E. J. de Pue, W. H. Phelps, E. D. Goodrich, F. M. Pray and F. McMullen.

WILLIAM LEWIS CO., Dec. 14. Object, to deal in tobacco. Capital stock, \$100,000. Directors—Francis Buckley, Jr., S. W. Levy, Solomon Lewis, Sigmund Hirschbaum and W. S. Baxter.

FRESNO WAREHOUSE CO., Dec. 15. Capital stock, \$100,000. Directors—George H. Eggers, Charles Kohler, F. T. Eisen, G. H. Walter and A. P. Adams.

CALIFORNIA PROHIBITION CO., Dec. 18. Object, to publish the California Prohibitionist. Capital stock, \$25,000. Directors—Henry French, J. B. Capp, C. A. Tupper, F. T. Holland, A. Calhoun, G. A. Rembrand, W. E. Ward, J. D. Shafter, all of San Jose; T. B. Stewart and A. G. Scheahan of S. F., and H. B. Land of Oakland.

PAYNE BOLT WORKS, Dec. 18. Object, a general iron-manufacturing business. Capital stock, \$300,000. Directors—Wm. Payne, G. L. Payne, Noah Payne, C. H. Williams and W. Newham.

PACIFIC PHONOGRAPH CO., Dec. 18. Object, to make and sell the Edison phonograph. Capital stock, \$2,500,000. Directors—Frank McLaughlin, J. I. Sabin, Andrew White, Louis Glass and M. Greenwood.

CAMP CREEK M. CO., Dec. 18. Directors—Daniel E. Hayes, J. H. L. Tuck, Wm. H. Sears, A. S. Folger and H. P. Christie.

Mining Share Market.

Mining stocks continue dull and inactive and are not expected to recover much before the middle of next month. The decrease of water in the Carson river to a point below the full milling stage has helped depress the market. This influence, however, is about at an end, if the present storm shall not break and scatter.

The Nevada mill is running to half its capacity on Chollar ore, the machinery being driven by the surface Pelton water-wheel. The apparatus for the transmission of power electrically from the six Pelton wheels on the Suvo tunnel level has not yet worked satisfactorily. The dynamos are now being overhauled.

The Alta mill will soon resume operations enlarged to 20 stamps. They have in the mine opened up and ready for extraction a large amount of ore.

The Justice mill will soon have the stamps dropping on ore from their mine.

"HAZELTON" BOILER PATENT CONTEST.—The action at law of the "Hazelton" Boiler Co. vs. the Hazelton Tripod Boiler Co., pending in the United States Supreme Court at Washington, D. C., involving certain infringements of patents of the former by the latter named company, was decided on the 18th instant in favor of M. W. Hazelton, assignor of the patents to the "Hazelton" Tripod Boiler Co., which is represented in the Pacific States and Territories by the Joshua Hendy Machine Works of this city as managers.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or of some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

A. F. JEWETT—Tulare Co.
F. B. LOAN—Southern California.
H. G. PARSONS—Northern California.
Geo. WILSON—Sacramento Co.
W. R. FRASER—Fresno Co.
W. W. TROBES—San Diego Co.
JOHN L. DOTY—Utah, Wyoming and Colorado.

Assessment Notices.

Gover Mining Company—Location of principal place of business, San Francisco, California. Location of works, near Drytown, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors held on the 23rd day of November, 1888, an Assessment (No. 1) of Fifteen (15) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 31st day of January, 1889, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the 11th day of February, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
L. G. HARVEY, Secretary.

Office—13 and 15 Fremont Street, San Francisco, Cal.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, State of California. Location of works, Gold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of December, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 21st day of January, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the 11th day of February, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
L. G. HARVEY, Secretary.

Office—313 California St., San Francisco, Cal.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, S. F., on Wednesday, February 20, 1889, at 1 o'clock P. M., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 13, 1889, at 3 o'clock P. M. By order of the Board of Directors.
J. M. BUFFINGTON, Secretary.

Office—Room 11, No. 303 California Street, San Francisco, California.

DIVIDEND NOTICE.

SAN FRANCISCO SAVINGS UNION. 532 California St., corner Webb. For the half year ending with 31st of December, 1888, a dividend has been declared at the rate of five (5) per cent per annum on term deposits, and four and one-sixth (4 1/6) per cent per annum on ordinary deposits, free from taxes, payable on and after Wednesday, January 2, 1889.
LOVELL WHITE, Cashier.

THE CALIFORNIA CONSOLIDATED

Gold Mining Company, Sierra City, Cal. A. Schubert, President; Alvin Fischer, Secretary; A. Leiler, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two locations. Ore assays \$7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

THE BUFFALO CONSOLIDATED GOLD Mining Company, Sierra City, Cal. Ernest Bush, Superintendent. Stock divided into 500,000 shares at \$1 per share. The property comprises 5 locations. Ore finely decomposed, carries coarse gold. Size of ledge: Tunnel No. 1, 32 ft.; No. 2, 91 ft.; No. 3, 10 ft. Fine black decomposed rock interspersed with white quartz. New 16-stamp unit run by a Pelton Wheel, blacksmith shop and boarding house. Stockholders: Ernest Bush, Hugh Murray, Frank Cook, J. G. Lee, Henry Carpenter. For further information apply to Ernest Bush, Sup't, or Hugh Murray, Sec'y.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING NOV. 23.	WEEK ENDING DEC. 6.	WEEK ENDING DEC. 13.	WEEK ENDING DEC. 20.
Alpha.	3.00	3.55-2.70	3.60-2.75	3.10-2.70
Alta.	3.00	3.50-3.00	3.20-2.70	3.00-2.70
And.	1.50	1.50-1.40	1.50-1.35	1.60-1.25
Argenta.	10	15	15	15
Belcher.	6.75	7.25-6.5	7.00-6.25	7.1
Brophy.	72	81	72	72
Bullion.	1.00	1.70-1.50	1.60-1.40	1.50-1.40
Baltimore.	60	70	55	65
Belle Isle.	50	60	55	55
Bodie Con.	1.75	1.85-1.70	1.85-1.55	1.70-1.45
Benton.	2.75	2.75	2.75	2.90
Bodie Tunnel.	60	60	60	60
Bulwer.	60	60	60	60
Con. Va. & Cal.	99	124	112	104
Challenge.	6	7	6	6
Chollar.	4.05	4.50-4.00	4.20-3.60	3.90-3.30
Confidence.	163	17	16	16
Con. Imperial.	1.05	1.20-95	1.10-85	1.05-85
Caledonia.	55	65	50	60
Con. Pacific.	50	50	50	50
Oregon Point.	52	65	55	65
Crocker.	90	95	85	90
Central.	30	30	30	30
Budley.	30	30	30	30
East B. California.	30	30	30	30
Eureka Con.	3.00	3.00	3.00	3.00
Exchequer.	1.35	1.60-1.25	1.35-1.20	1.35
Grand Prize.	60	80	80	80
North & Curry.	2.40	4.35-4.50	4.70-3.90	4.40-4.20
Hale & Norcross.	6.25	6.75-6.5	6.5	6.00
Holmes.	60	60	60	60
Independence.	60	60	60	60
Iowa.	60	60	60	60
Julia.	1.80	2.25-1.80	1.95-1.75	1.9
Justice.	1.80	2.25-1.80	1.95-1.75	1.9
Kentuck.	2.50-2.70	3.00	2.70-2.75	2.90
Lady Wash.	55	70	55	55
Marlin White.	1.40	1.40	1.10	1.10
Mexican.	4.60	5.25-4.90	5.25-4.70	4.95
Mt. Diablo.	2.50	2.50	2.50	2.50
Northern Belle.	2.15	2.25-2.50	2.25-2.10	2.20
Navajo.	2.10	3.53-3.10	3.50-2.70	2.85-2.80
Niagara.	2.80	4.00-2.50	3.50-2.80	3.00-2.95
Nev. Queen.	2.70	2.50-2.70	2.80-2.10	2.25-1.80
North G. & C.	71	81	71	71
Occidental.	71	81	71	71
Ophir.	2.00	2.15-1.80	2.01-1.55	1.75-1.00
Overman.	3.00	4.15-3.70	3.75-3.05	3.40-2.75
Potosi.	1.70	1.75-1.60	1.75-1.55	1.70-1.40
Peerless.	60	60	60	60
P. Sheridan.	60	60	60	60
Silver Star.	4.5	5.00-4.50	4.70-3.85	4.25-3.80
Savage.	3.55	3.90-3.50	4.40-3.90	3.35-3.00
S. B. & M.	80	4.20-3.80	4.00-3.50	4.00-3.75
Sierra Nevada.	70	75	75	75
Silver Hill.	70	75	75	75
Silver King.	60	65	65	65
Scorpion.	60	65	65	65
Syndicate.	3.75	4.25-3.85	4.20-3.60	3.90-3.55
Union Con.	1.50	1.70-1.55	1.70-1.40	1.60-1.50
Utah.	5.50	6.00-5.50	5.50-4.90	5.2
Yellow Jacket.	60	60	60	60
370 Mexican.	4.65	4.65	4.65	4.65

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THURSDAY, Dec. 20.		100 Mt. Diablo.....	2.60
100 Alta.....	2.80	300 New York.....	.50c
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210 B. & Belcher.....	1.40	50 Oquirrh Nevada.....	1.75
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100 Baltimore.....	4.50	150 Occidental Con.....	2.00
100 Caledonia.....	.55c	250 Potosi.....	2.35
200 Challenge.....	6.00	100 Peerless.....	1.95
50 Chollar.....	3.55	150 Savage.....	4.00
100 Co Va & Cal.....	10.00	500 Ophir.....	2.50
350 Concordia.....	.90c	150 S. B. & M.....	3.15
100 Crocker.....	.75	100 Silver Hill.....	.80c
250 Crown Point.....	7.50	150 Utan.....	1.40
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100 Gold & Curry.....	4.30	350 Union Stock.....	.80c
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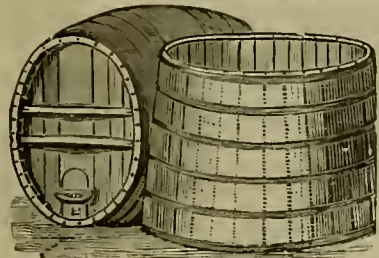
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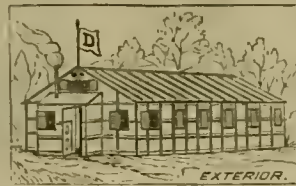
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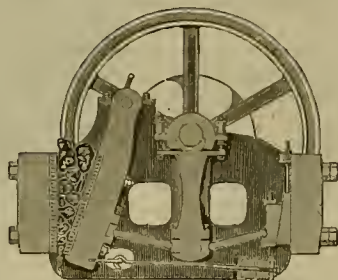
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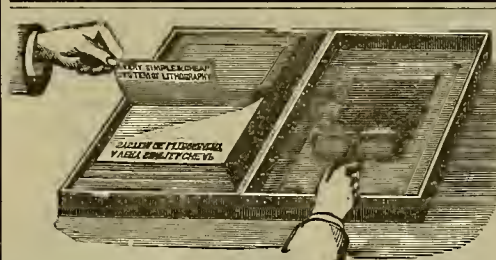
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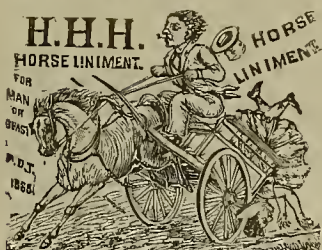
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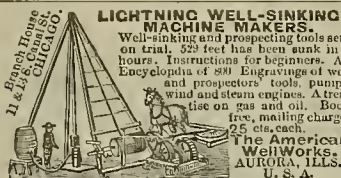
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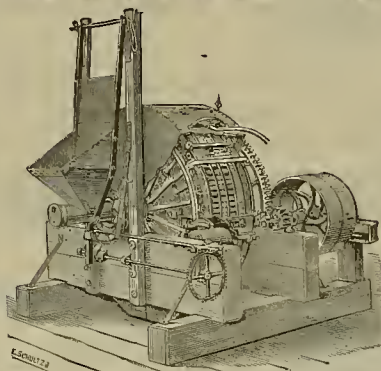
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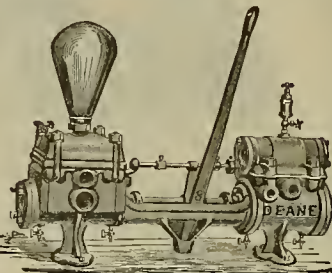
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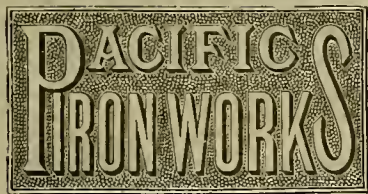
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I have crushed in that time probably not less than 10,000 tons of this material, without any repair being necessary, and without any change of ehoes and dies, and, as far as I can judge, they appear to be good for as much more service.

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ERNEST L. RANSOME.

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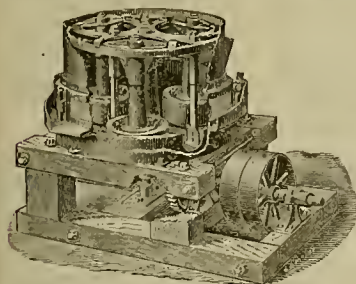
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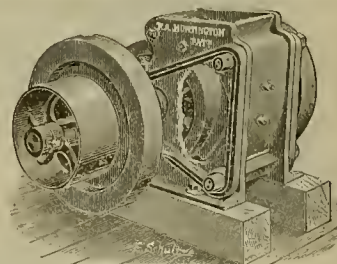
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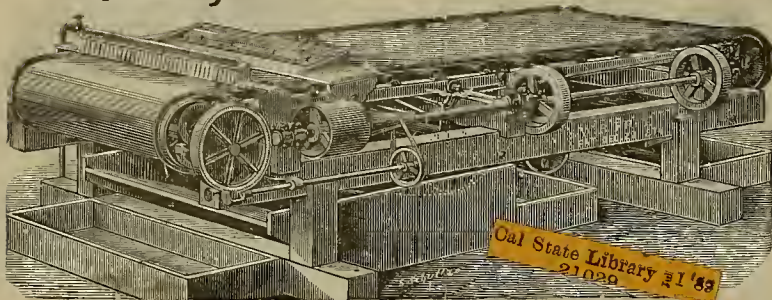
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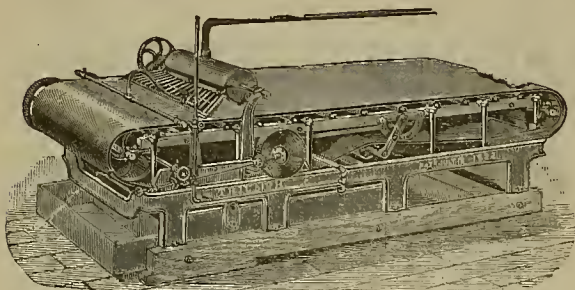
N. B.—Since the above was written the 20 Vanners having been started gave such satisfaction that 44 additional Frues and more stamps have been purchased.

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Protected by patents May 4, 1869; December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883. Patents applied for.

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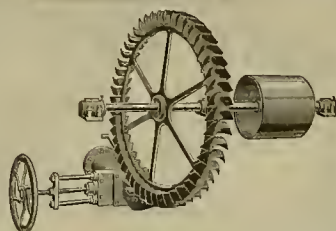
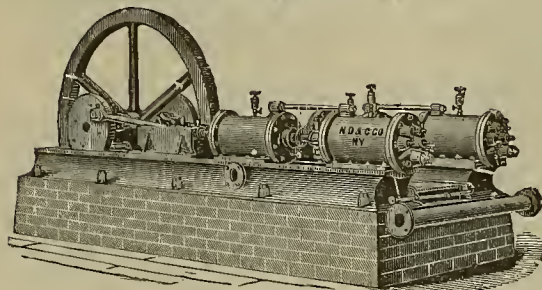
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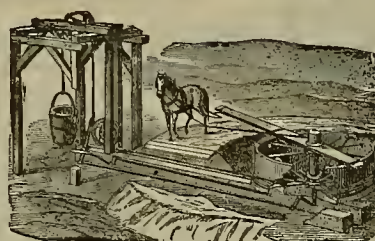
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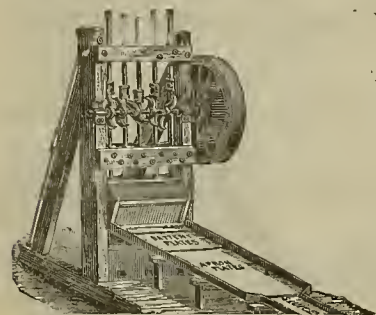
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TWENTY-PAGE EDITION.

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SAN FRANCISCO, SATURDAY, DECEMBER 29, 1888.

VOLUME LVI
Number 26.

Spirally Welded Tubing.

We have several times of late alluded to the new industry of making serviceable pressure pipes of great strength from strips of steel or iron wound spirally, heated only along the overlapping edges, welded by hammering, and finished into tubes of uniform diameter, and of such length as may be desirable. The process of manufacturing these spirally welded tubes is interesting and was recently described by J. C. Bayles of New York, before the American Institute of Mining Engineers. The raw material is ordinary sheet iron, or steel of commerce. The lightest metal made into tube is No. 29 iron, and the heaviest, steel of between 12 and 14 gauge.

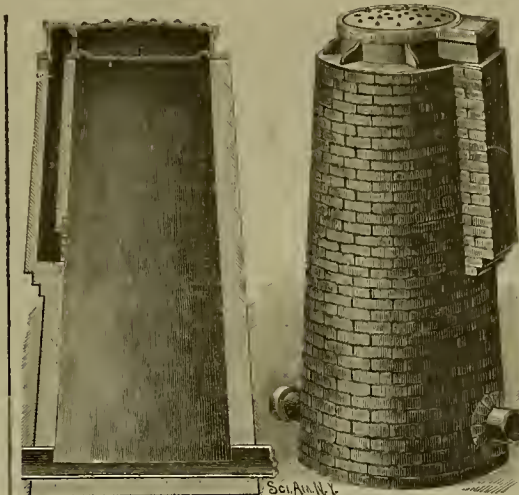
As it is difficult to obtain sheets longer than 12 feet, it is necessary to unite the ends by lap-welding, if long pipes are desired. To make a 6-inch pipe 30 feet long from 12-inch skelp, it is necessary to have a ribbon of metal about 49 feet long. The ends of the strips of skelp are united by a machine known as a cross-welder. The sheets are so placed as to give about $\frac{1}{2}$ inch lap, and in this position they are firmly clamped. Heat is then applied by furnaces above and below, which move along the seam. As they recede, the hot edges are welded between a hammer moving vertically and an anvil of reciprocal motion. To place and clamp the skelp, heat the overlapping edges and weld them, consumes about one minute to each cross-seam of 12 inches. A pressure of the foot of the operator upon a treadle engages a worm-wheel and worm which rotates a reel upon which the skelp is wound. As it is drawn from the reel, it passes between pressure-rolls which smooth out any buckling or other irregularity in the still hot metal, and rotary shears trim off the burr at the ends of the welded seam. In case the weld is defective or the sheets have not been clamped in line, the weld is cut by a shear held suspended when not in use, and the ends are welded again.

The pipe machine is quite simple in construction, and is chiefly made of heavy castings, requiring but little finish. It occupies about 3x6 feet of floor space. The engraving shows its form.

The essential features of the pipe machine are a guide-table for the skelp, adjustable to the desired angle; feed-rolls, to pass it forward with an intermittent progress, so that it shall advance when the hammer is raised and be at rest when the hammer falls; a former, to curve the metal to the desired radius, also adjustable; a furnace, to heat the metal; a hammer, to weld it, and an anvil to support the pipe and receive the shocks of the hammer. No mandrel is used.

The pipe in the forming process is held in place by a pipe mold, which is a cylindrical shell, within which the pipe rotates as the stock is

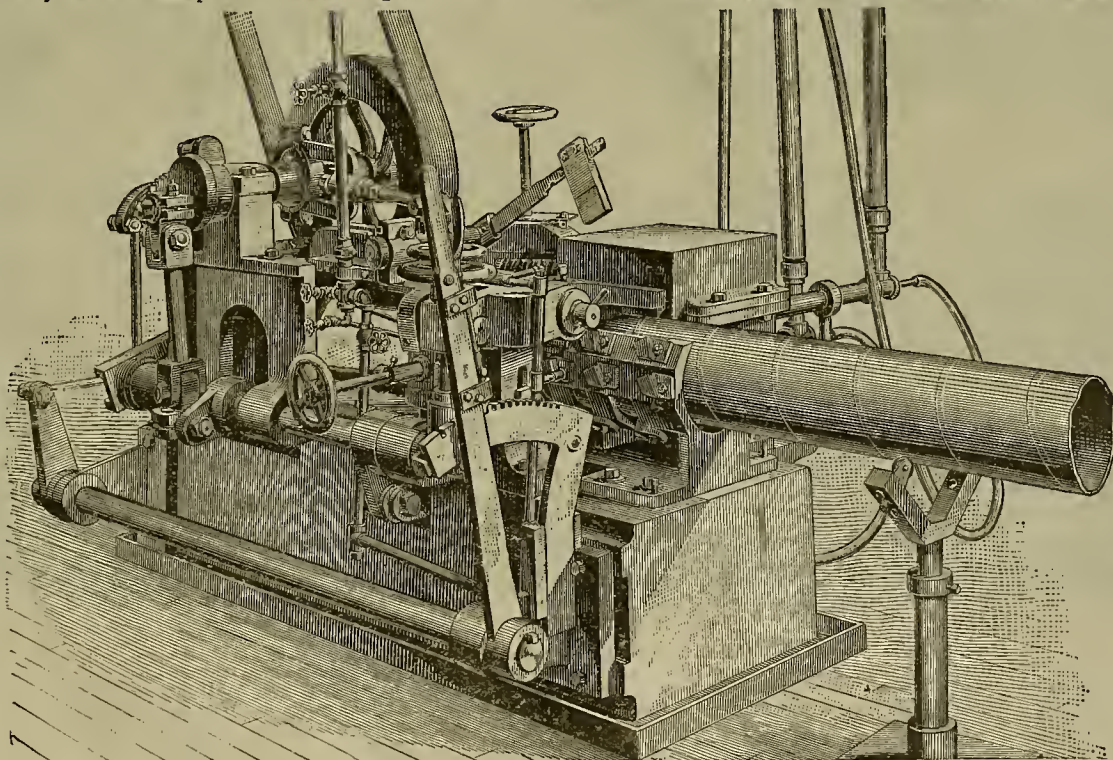
form in the refractory lining of the furnace. One gas flame has been found sufficient, but two work better; and besides being more conven-



MORGAN'S VENTILATING MANHOLE.

fed in. The anvil is of considerable mass, steel-faced, and extends the entire width of the skelp. The hammer is light, and at normal

ient to control, they heat the metal more rapidly and permit an accelerated feed. As very little gas is wasted, the greatest economy attends



MACHINE FOR MAKING SPIRALLY WELDED TUBING.

speed strikes 160 blows per minute. The heating is done in a furnace so constructed as to heat both the edges to be united for the space of several inches ahead of the point at which the welding is effected. The upper skelp enters the furnace flat, and the lower skelp curved, having already been through the forming-jaws. The heat is imparted by one or two blow-pipes of water-gas and air, discharging upon the metal through passages of suitable

the most rapid production of pipe, irrespective of the quantity turned, which in any case is about 30 feet per foot of welded seam.

The speed of production depends, as stated, upon the thickness of stock to be heated and the relation of width of skelp to diameter. It averages a foot per minute to each machine, and it is probable this average can be raised considerably. The machines are so nearly automatic in operation that very little skilled labor

is needed in running the plant. The operator has his gas, air and feed under control by convenient means, and varies the relations until he has them just as he wants them. He can see the edges as they emerge from the furnace, and about all the skill he needs is that which will enable him to judge by its color whether the iron is above, below or at the welding heat. Unskilled labor prepares the stock and removes the finished product.

Ventilating Manhole for Sewers.

Engravings on this page illustrate the ventilating manhole recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency by Thos. W. Morgan, City Engineer of Oakland, Alameda Co. The construction is quite simple but effective. As the sewer gas or vapor arises from the sewer into the manhole, the close-fitting pan prevents its escape (as ordinarily through the perforated cover over the main opening), and the gas is forced through the grating and flue, through the charcoal, which deodorizes the gas and arrests and destroys any germs of disease which may come up from the sewer. The air then passes through the opening in the side of curb to the space between the pan and cover and thence through the perforations of the cover to the open air in the street or yard. Numbers of these appliances are now in use in Oakland and elsewhere, and giving good satisfaction.

As to the use of charcoal as a disinfectant, Eliot & Storer's Inorganic Chemistry says it depends not merely upon its mechanical ability to absorb offensive gases, but also, and mainly, upon the fact that the absorbed gases are chemically destroyed within the pores of the coal by the oxygen which is sucked into these spaces from the air. The purifying action depends upon oxidation, upon the burning up of the offensive gases as fast as they are formed. A great merit of charcoal as a disinfectant is that it constantly draws into destruction the offensive matter around it.

"Sieves of charcoal placed across the air-vents of sewers in such manner that the outgoing air may be filtered through the charcoal, are found to be most effi-

cient instruments for destroying the noxious effluvia which commonly escapes from these openings. In this case, where a current of air is constantly passing through the charcoal filter, the latter will preserve its efficiency for an indefinite length of time if it only be kept dry; for the action of the coal consists in merely bringing about oxidation and destruction of the gases of the sewer, and as one portion of this is consumed a new portion can be taken into destruction."

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Lixiviation of Silver Ores With Hypo-sulphite Solutions.

NUMBER 4.

The presence of caustic (soda or lime) in the leaching solution is generally injurious to the extraction of silver. Mr. Stetefeldt explains this by the supposition that a certain proportion of caustic will act superficially on particles containing silver and lead, copper, etc., producing a film of insoluble hydroxide. This looks plausible, and may be the true explanation, yet it would seem that, if it were so, the presence of enough of caustic soda to dissolve that film (in the case of a silver-lead compound) should result in the extraction of the silver. Again, it would seem that sodium carbonate should also produce an impeding film, since the lead (and cupric) carbonate is as insoluble as the hydroxide, yet Mr. Stetefeldt declares the sodium carbonate to be harmless; as a matter of fact, in one instance it did prevent the extraction of silver. However, I am not prepared to give any better explanation at present. Suffice it that caustic is harmful; let us see how it may be avoided or corrected.

I have shown in a previous article that calcium polysulphide is not likely to cause causticity of the hypo; sodium polysulphide is very liable to contain caustic soda unless made in strict conformity to certain rules—so says Mr. Stetefeldt. Add to these facts that caustic soda decomposes calcium polysulphide, forming sodium polysulphide and precipitating a salt of lime (calcium hydrate?) and we at once perceive a ready means of neutralizing a caustic sodium polysulphide.

To a solution of sodium polysulphide, caustic soda was added, and the liquid was divided into two parts: To the one part, *a*, calcium polysulphide was added as long as it produced a precipitate; to the other part, *b*, no addition was made. A solution of silver in sodium hypo was divided into two parts, *A* and *B*. The silver in *A* was accurately precipitated by *a*; that in *B* by *b*. After settling, *A* was neutral to litmus and to turmeric; *B* was strongly alkaline.

Here a new phenomenon presented itself. Although *B* had not received an excess of *b*, yet, after a short time it contained free sodium sulphide. This, though unexpected, is easily accounted for; the caustic soda had reacted on the free sulphur in the precipitate, forming sodium sulphide. This illustrates the ease with which the free sulphur in the precipitate may be recovered in this form of polysulphide by simply digesting the precipitate with caustic soda or milk of lime (see my book on *Leaching Gold and Silver Ores*). Theoretically it would be possible to precipitate with a polysulphide containing caustic, and obtain a precipitate free from uncombined sulphur, and a liquid free from caustic, but in practice this would not be feasible; it is better to add calcium polysulphide to the sodium polysulphide as long as it precipitates; the lime which settles out may perhaps be used again for making the calcium sulphide, of which but little will be required, and that can be kept any length of time in carboys or casks.

Caustic in sodium sulphide may be neutralized by an addition of sodium bicarbonate, the quantity being controlled by a test as in the case of caustic hypo. Another method is to force sulphur dioxide into the liquid until hydrogen sulphide is evolved. Sulphur dioxide may be made by burning sulphur in a simple form of furnace or kiln, the fume being pumped into the liquid; or it may be produced from sulphuric acid and a sulphite, or the same acid and charcoal in an iron retort by the aid of heat, in which cases a pump will not be needed; it will convert the caustic soda into sulphite which finally becomes hypo.

Carbon dioxide forced into the sodium polysulphide solution containing caustic will convert the latter into carbonate; it should be discontinued as soon as hydrogen sulphide is evolved, otherwise it will convert the polysulphide into carbonate. Carbon dioxide may be produced by the perfect combustion of charcoal or other carbonaceous matter or by the action of an acid on limestone or an alkali carbonate; also by heating zinc dust with calcium carbonate in a retort (only fit for the laboratory). But the most practical way in which to neutralize caustic sodium polysulphide is by adding calcium polysulphide. The desired result may also be attained by adding sulphuric acid, converting the caustic soda into sulphate. But the chief and most troublesome cause of causticity in the stock hypo is the presence of caustic lime in the roasted ore which then yields an alkaline wash-water. Lime is not sufficiently soluble in water to admit of the removal of any considerable quantity of it by the washing.

It is better to forestall the action of the lime than to correct the causticity produced in the hypo. This was done by Henry Kearsage at Tombstone, by washing the ore with acidulated water, the use of which, following a first washing with plain water, must be continued until it issues with a neutral or slightly acid reaction, when it may be followed by hypo. In the Russell process the result is attained by means of a solution of bluestone following the wash-water, and followed by the hypo. Solu-

tion of iron sulphate would serve the purpose and is cheaper than bluestone. Of other available methods we have the following: 1st. Impregnation of the first used portion of hypo with sulphurous acid, either by adding sulphuric acid, which decomposes some of the hypo, forming sulphurous acid, or by injection of sulphur dioxide, as already described. 2d. By a similar process with carbon dioxide in place of sulphur dioxide. 3d. By a solution of lead sulphate in hypo. 4th. By a solution of lead carbonate, made by passing carbon dioxide into hypo in presence of lead carbonate which rapidly dissolves.

A possible cause of causticity of the hypo in treating roasted ore is the presence of metallic silver; the methods 1, 2, 3, and 4, for prevention would probably be serviceable in such a case. In treating unroasted ores, we may have metallic silver or metallic copper in small particles, also cuprous oxide (red oxide of copper) either of which may cause causticity. Preventive measures may be those above described under 1, 2, 3, 4, or, in the case of cuprous oxide, washing with acidulated water, only that the acid should be not sulphuric but hydrochloric (or sulphuric with addition of a chloride, as common salt), which will convert the cuprous oxide into cuprous chloride. The cuprous chloride remaining in the ore will form "extra solution" with the first portion of hypo used, and this may be kept separate for application at a later stage if desired.

If the hypo has been permitted to become caustic, it must be neutralized. In the Russell process this is effected by adding an acid, such as sulphuric or hydrochloric. It would be better to use sulphur dioxide. Carbon dioxide is also suitable, though inferior. The sulphate of lead, copper or iron will answer, or the solution of lead carbonate, already mentioned. Sodium bicarbonate may be used, but it is rather expensive; the means of knowing when enough has been added have been mentioned in a previous article. Sodium bisulphate will serve the purpose, as it would also as a preventive in case of caustic lime in the ore, being dissolved in the water used for the washing. Sodium bisulphate is a cheap product of the acid works, and could probably be used with economy in place of sulphuric acid in any of these neutralizing operations. It may happen that a sodium hypo contains both caustic and carbonated soda, and, as both have an alkaline reaction, it has been suggested that there would be a difficulty in neutralizing the caustic while leaving the carbonate intact. This, however, is not so difficult. Take a measured portion of the liquid and add solution of calcium carbonate as long as it precipitates; if the liquid still reacts, alkaline caustic is present, and the quantity of acid or of sodium bisulphate required to neutralize it is the measure of the quantity required for the entire or any volume of the stock solution. If sulphur dioxide is used, it is of little importance to know when the caustic is neutralized, because, if the carbonate is also neutralized it only forms sodium sulphite, which is an excellent solvent for silver chloride, oxide, etc., and is as good as the carbonate to prevent the extraction of lead.

Since writing article No. 3 I have found that the lead chromate settles very well if the liquid is slightly warmed and well stirred.

I have just made another experiment with a view to throwing light on the chemistry of the precipitation of silver. A part of the silver in a hypo solution was precipitated by sodium polysulphide, the remainder accurately by potassium xanthate (an extremely delicate reagent). Hydrochloric acid was added to the filtrate to decompose the thio sulphate, and after settling the clear liquid was decanted and some solution of mercuric chloride added. On warming for some time a white precipitate gradually formed, which assumed a yellowish tinge as it increased. The liquid, without the mercuric chloride, remained clear when heated. The reaction indicates the presence of tetrathionic acid, which must be present if my theory be correct.

I have not yet found a reagent which will indicate the presence of silver in hypo solution when other metals are also present, and such a reagent is a desideratum; but I have found a means by which a very small proportion of copper may be detected in presence of silver.

If solution of potassium ferriyanide is added to a solution of silver alone in hypo, the liquid is colored yellow. If but a trace of copper is present, each drop of the ferriyanide produces a reddish-brown precipitate, which redissolves and the liquid assumes a reddish color which is very distinct. With more copper the color deepens. This test may be of use in leaching.

Concerning the use of sodium sulphite, I find that when a precipitate of silver sulphide mixed with free sulphur is treated with a slightly warm solution of sodium sulphite, not only is the sulphur dissolved, making hypo, but the silver sulphide becomes very compact, forming lumps of malleable silver glance. Sodium sulphite is useful in the determination of the proportion of silver chloride in roasted or raw ores. The ore powder is washed and treated with solution of sodium sulphite as long as any metal is dissolved and the filtered liquid is decomposed by nitric acid; any silver which was combined with chlorine falls out as chloride, and that which may have been dissolved from other compounds (except bromide, which acts like chloride) may be precipitated from the filtered liquid by a soluble chloride. If the ore contains cuprous chloride that will interfere probably by yielding its chlorine to the liquid. Silver chloride and bromide dissolve readily in solution of sodium sulphite, while the iodide is

but very slightly soluble. As all three dissolve easily in aqueous sodium thiosulphate, the difference affords a means of at least an approximate separation of the haloids.

December 15, 1888. C. H. AARON.

Neglected Sources of Power in the Mines.

EDITORS PRESS:—As a general rule our mines are located upon the mountain ridges that divide the rivers and their principal branches from each other, and as a consequence very few of our mills and hoisting works are run by water-power because few streams of sufficient size exist above the sites they occupy within a reasonable distance. Though it is impracticable to try to make water run uphill, there is no natural law to prevent electricity, compressed air or wire cables doing so whenever economically practicable. There are plenty of streams leading down from the mountain ridges where the mines are located with sufficient water and fall—often within a few miles of a mine, though many hundred feet below its level—which might be utilized to drive a Pelton wheel or a turbine to furnish abundant power to drive dynamos to generate electricity, drums or pulleys to carry wire cables, or air-compressing machinery to furnish compressed air to be conveyed to the mines. It is a question of economy only which must determine in each case whether expensive steam machinery shall be erected at the mine or one of the other methods referred to be resorted to for the purpose of utilizing an available water-power below its level.

For instance, the cost of a plant for a Pelton wheel and dynamos, including wiring and motors, is light compared to that of steam engines and appurtenances of equal power, to say nothing of the cost of fuel and attendance. The expense of a wire-cable plant would probably be still less than that of the electric plant. In view of the success of our cable roads in this city, and of the recent successful trial of the electric outfit on the Comstock, the economical considerations involved are such as to recommend a trial, by some of those interested, to determine the availability of these methods in suitable localities of reducing the cost of extracting and reducing the ores of our gold and silver mines, especially in the higher mountain regions.

In regard to the use of compressed air in such cases, the writer believes a much cheaper and simpler mode of compressing air than that generally used may be adopted—one that is automatic and requires but a small quantity of water where there is sufficient fall to afford the pressure required. It consists in having the lower end of the pipe conveying the water so arranged as to discharge vertically into a tight, strong receiving-tank. One or more small air pipes must be inserted into the vertical portion of the pipe above the tank, with the stem reaching downward (inside the pipe) nearly to the open end, below the top of the tank (inside), through which the water is discharged under pressure. The upper end of the little air pipe, being outside the main or water pipe, should have a funnel mouth, so as to favor the passage of air, which will be sucked in and discharged with the water into the receiving-tank. This tank must have one or more discharge water-cocks near the bottom so as to regulate the discharge of water according to the inflow of the same. It must have also an air-cock or valve at the top to let the compressed air from the tank into a strong and capacious reservoir for storing the same preparatory to leading it through pipes to the mine for driving the machinery.

Water-blasts for forcing air into mining drifts for ventilation are not new, but the compressing of the air automatically for power to drive machinery is equally practicable with proper appliances. The scientific principles involved are the same. It is merely a skillful, yet simple, method of utilizing the well-known principles of the compressibility of air, of hydrostatic pressure and of the suction or inhalation of air by a descending column of water, under the conditions described. It has been done on a small scale, and may be certainly done on a large scale by machinery adapted to that purpose. Such a source of power, it will be readily seen, must be the cheapest of all where ordinary direct water-power is not available.

In the transmission of power from the generator or producer to the consumer the loss of power incident to the method employed and the distance traversed necessarily forms an important item in considering its availability for the purpose to which it is destined. Without going into details or statistical tables, it may be said that, for a distance less than three miles, wire-cable transmission of power suffers a lighter percentage of loss than either of the others, and beyond that it loses most. Electricity is now claimed by its votaries, however, to work up to a higher per cent than any other form of mechanical power. But where water-power is available in the ways above described, the percentage of loss in transmission is of less consequence than when using steam, the first cost of the power being so much less comparatively. By thus utilizing the pressure of small streams, within reasonable distance from the mine, existing below its level, in one of the ways suggested, reduction works can always be located at the mine and thus save hauling; and if there is not water enough for the batteries available above

the level of the mill, it may be supplied by hydrostatic pressure, or force pumps, working automatically from a lower station. There are many mines in California containing an abundance of good ore that are condemned, or idle, for lack of water sufficient for steam or battery purposes that can be brought to them by gravitation, which might be rendered valuable and productive by conveying power or water, or both, from some available source at a lower level in one of the ways above described. Such neglected sources of power are abundant in the mining regions, and these suggestions have been written in the hope that they may be more generally utilized in the future than they have been in the past. PROGRESS.

Mining Company Meetings.

At the annual meeting of the Ophir Mining Company the following officers were elected: President, Chas. H. Fish; vice-president, A. B. Hull; A. W. Havens, Con. O'Connor, W. S. Lyle, Morris Hoeflich and H. Zadig, trustees.

Secretary Holmes presented his report for the year ending December 14th, which is as follows: Receipts—Cash on hand December 15, 1887, \$17,701.94; superintendent's balance account, \$160.89; assessments, \$50,400; ores, \$9594.08; hoisting, \$120 76; compressed air, \$3458.21; total, \$92,635.88. Disbursements—Insurance, \$1606.50; assaying, \$631.50; surveying, \$15; taxes, \$655.21; salaries and wages at mine, \$31,799; incidental, \$352; office expenses, Virginia, \$911.35; supplies and miscellaneous expenses, \$22,162.36; freight and hauling, \$707.72; office expenses, San Francisco, \$6256; team account, \$143 66; legal expenses, \$415 96; interest and exchange, \$227.24; water rent, \$1200; superintendent's balance account, \$335.99; total, \$67,429. Cash on hand \$25,206.39.

At a meeting of the directors of the Silver Hill Mining Company, held in this city, A. C. Hamilton was appointed superintendent and instructed to resume operations in the mine forthwith. It is claimed that ore assaying \$35 a ton was cut in sinking the shaft, and this is to be explored to ascertain its extent. The Silver Hill has a fine steam hoist and pump plant and a building over the shaft. The shaft is thought to be in fair condition down to the 600 level.

The following officers were elected at the annual meeting of the Gould and Curry M. Co.: President, Geo. R. Wells; Vice-President, Chas. H. Fish; Trustees, George Frier, Morris Hoeflich, Robert Sherwood, Herman Zadig and Joseph Marks. A. K. Durbrow was re-elected Secretary and Patrick Kerwin Superintendent.

The Secretary's financial statement was as follows: Receipts—Cost balance, as per statement December 19, 1887, \$25,901 67; assessments Nos. 57, 58 59 and 60, \$145,554.50; mine account, \$39,729.34; haulion account, \$58,116.66; total, \$269,302 17. Disbursements—Mines supplies, \$60,238.26; labor and salaries, \$125,131.38; water, \$2421 20; surveying, \$300; assaying, \$3267 01; G. and O. B. and B. joint shaft, one-half expenses, \$2254.15; Virginia office expenses, \$543 16; team expenses, \$262 50; hauling, \$2230.03; general office expenses, "San Francisco," \$2380 85; stationery and printing, \$227 80; advertising, net expense, \$805.90; traveling expense, \$140; exchange, \$719; interest, \$362.25; taxes, \$408.34; legal expenses, \$492.21; insurance, \$630; sluice tunnel, \$20,909.27; real estate, "Virginia," \$21 50; milling ore, \$23,923.55; royalty Sutro Tunnel, \$4298.65; freight on haulion, \$174.95; discount on haulion, \$11,931.30; total, \$264,072 37. Balance cash on hand, \$5229.80. Total, \$269,302.17.

The Superintendent's annual report says: There has been extracted from the 425, 300, 250 and Drain Tunnel levels 3417 1300-2000 tons of ore, which has been milled by the Douglas mill at a cost of \$17 per ton, and yielded bullion of a total assay value of \$56,134.41, which shows an average yield of \$16.42 per ton. This bullion carried 17,180.36 in gold and \$38,954.05 in silver. There has also been sold to Thomas Halley 881 tons of second-class ore at \$2.25 per ton.

The Mount Diablo M. Co. has elected the following officers: Pres., W. E. Norwood; Vice-Pres., J. M. Shotwell and J. N. Knowles; G. W. Grayson and R. W. Heath, Trustees. R. W. Heath was re-elected Sec'y and W. H. Shockley, Supt.

The secretary's financial report is as follows: Receipts—1887—Dec. 15th, cash on hand, \$2468.81; gross bullion, \$405,754.72; total, \$411,223.53. Disbursements—Mine labor, \$76,441.49; fuel for mine, \$3403.88; mine machinery, \$791.75; water for mine, \$3000; lumber, \$686.60; mine supplies, \$4306.61; freight at mine, \$2439.06; general expenses of mine, \$1783 33; mill labor, \$35,152.50; lumber for mill, \$709.67; water for mill, \$600; freight at mill, \$3116.72; mill machinery, \$2745 57; fuel for mill, \$33,585 95; salt for mill, \$6858.37; mill supplies, \$9051.72; general expense at mill, \$1290.77; transportation of ores, \$15,793 09; taxes, real estate and bullion, \$4932.97; insurance, \$1889.15; disbursements, San Francisco office, \$5430.93; dividends 8, 9, 10, 11, \$40,000; bullion discount, \$107,740.11; express charges on bullion, \$3580 15; charges for refining bullion, \$3491.72; custom ores, \$12,538.36; gross bullion unsold, \$15,244.96. Dec. 11, 1888, cash on hand, \$9568.40; total, \$411,223.53.

The bullion report shows the total amount of

bullion shipped to be \$410,239.89. Less bullion from 154 tons of custom ore, \$20,762.72. Bullion shipped from Mount Diablo ore, \$389,477.17. Tons Mount Diablo ore crushed, \$211. Average battery assay, \$51.78. Percentage of moisture in ore, 7.25. Percentage of salt added, 11.13. Moisture in salt, 7. Assay of ore as shipped from mine, \$53.38. Percentage of silver extracted, 88.8. As an cleanup has been made in the mill, the actual percentage of silver extracted is more than is shown by the above figures, and is probably from one to two per cent higher.

At the annual meeting of the stockholders of

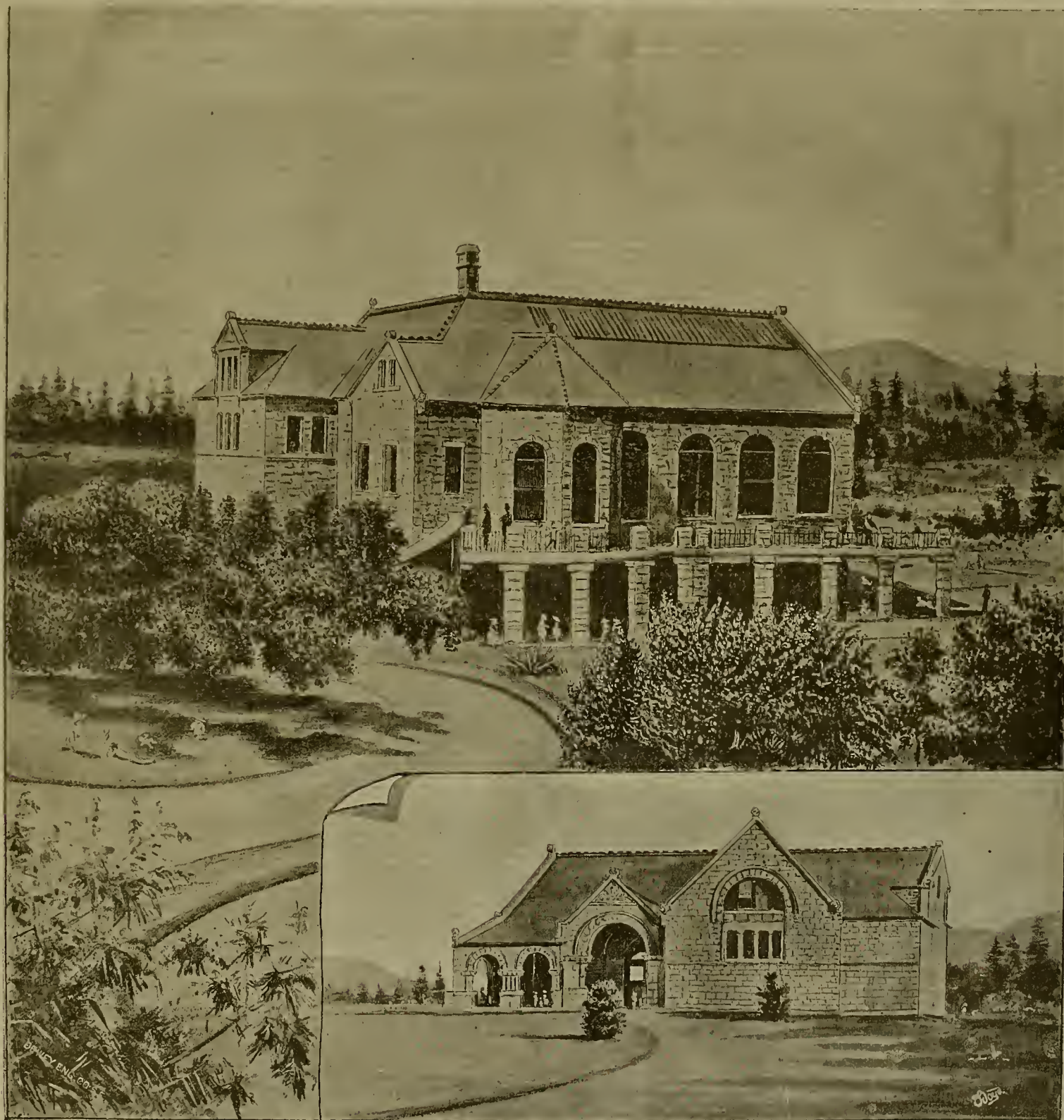
J. E. Hawkins secretary, and Butler Burris assistant secretary. The superintendent of the mine has not yet been appointed. The company is in good financial condition, having a cash balance on hand amounting to \$19,084.53.

COSTLY ROLLING STOCK.—In the past 16 months about \$5,000,000 has been spent by the Southern Pacific Company to equip its railroad system with new cars and locomotives. This is the largest amount of varied rolling stock ever contracted for by any railroad corporation within so short a time. All the contracts were

The Children's Playground.

That was a glad day for the city children when it was decided to expend the bequest of \$50,000 by the late William Sharon, in making a spacious playground in Golden Gate Park. The site selected for the playground, which will always be remembered as "Sharon's Quarter," is in a little valley about 1300 feet wide and 800 feet long, located due west from the terminus of the Haight-street cable line. The valley has been filled to an average depth of about four feet with material taken from a

A DUN GLEN GOLD MINE.—Nearly three years ago James Hendra and Richard Eva located a quartz-mining claim in the Dun Glen mountains about a mile and a half from the village. Both being experienced miners, they went to work to develop the claim systematically. They first ascertained by development the course and dip of the lead and then ran a tunnel which cut the ledge at a depth of 60 feet. In this tunnel the lead is from 4 to 7 feet wide and it carries from \$15 to \$25 per ton in gold. Subsequently they ran a second tunnel, which cut the lead over 100 feet below the surface. In a drift run on this level the ledge



THE SHARON HOUSE AND PARTIAL VIEW OF THE CHILDREN'S PLAYGROUND, GOLDEN GATE PARK, SAN FRANCISCO.

the Locomotive M. Co., the following gentlemen were elected officers for the ensuing year: President, H. B. Havens; vice-president, T. F. Fish; and L. C. Fraser, David Hunter and A. H. Fish, directors. A. H. Fish was re-elected secretary and I. D. Smith, superintendent. The secretary's report showed a balance of \$2739.39 cash on hand.

The control of the Andes Mining Co. changed hands at the annual meeting of the stockholders. John Landers, who has been connected with this company since its organization, retired from the position of president and general manager.

At the meeting the number of shares represented was 91,885, which were all voted for the following directors: J. W. Brown, W. S. Lyle, M. P. Hall, Walter Turnbull and M. W. Fox. At a subsequent meeting, J. W. Brown was appointed president, M. W. Fox vice-president, James

made by C. P. Huntington, and received his personal supervision. Most of the new rolling stock has been delivered. A reporter asked General Superintendent Fillmore to explain the character of the contracts for the rolling stock. He said that 180 locomotives had been bought for an average sum of \$10,000 apiece, some 40 sleeping cars for \$14,000 each, 75 passenger coaches that cost \$5000 each, between 2500 and 3000 box and flat cars, the former costing \$600 apiece and the latter \$400 each, also a number of tourist, baggage, mail and express cars that cost \$75,000 in the aggregate.

It is stated that a party of New Orleans capitalists have bought the Clark and Anderson group of mines in the Planchas de Plata district, 20 miles southeast of Nogales, in Sonora. The property is considered about the finest mining property in the State of Sonora.

small mound near the valley. It is spacious enough to accommodate 5000 or more romping children. Here are music-stands, lawns for tennis and baseball, swings, and a picnic-ground composed of latticed arbors, with many sunny nooks and warm, sheltered corners. At the west end of the playground is a large dairy building, where milk, cream and eggs will be furnished the little ones at cost price. Our picture gives a very good idea of this beneficent and delightful place.

DETECTING ACIDS IN OIL.—Acids in lubricating oils may be detected by analysis in a laboratory, or by putting the sample to be tested in a clear glass bottle with a copper wire running down through the cork, air-tight; stand the whole in a sunny place for two or three weeks, and then, on removal, if verdigris or green rust appear on the copper, an acid is in the oil.

has widened from a foot and a half to four feet, and the ore assays from \$20 to \$30 in gold and from \$15 to \$23 in silver to the ton. They now have plenty of ore in sight and excellent prospects for one of the largest and richest gold-bearing claims ever developed in this part of Nevada.—*Silver State.*

PATRICK HAMILTON, a well-known pioneer citizen and journalist of Arizona, died at Phoenix on the 20th inst. He was a member of the tenth session of the Legislature, and was Sergeant-at-Arms of the eleventh session, which appointed him Commissioner of Immigration. Governor Tritle subsequently reappointed him for four years, and to his indomitable efforts in behalf of Arizona much of its present prosperity is due. His "Resources of Arizona" is to this date read with much interest throughout the Eastern States.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ALPI.—*Ledger*, Dec. 22: Last Wednesday, in company with Col. W. T. Robinson, we paid a visit to this property. It is located half a mile east of the Moore mine. The croppings are very strongly marked, a huge mass of quartz at least ten feet wide projecting from the surface for several hundred feet. It is an immense wall of quartz, many thousands of tons being exposed by the cropping. There is also two feet of gouge matter on the west side. There has been no development-work done upon the property worth speaking of. A shaft at the north end of the croppings has been sunk 50 feet on the ledge, from which 100 tons or so of quartz has been accumulated on the dump. At the south end the ledge has been quarried out 15 feet deep, throwing up another large pile of quartz. These two workings are about 500 feet apart, and the croppings are distinctly marked all the way between and for some distance beyond them. There is no question about the rock being there in quantities sufficient to satisfy the jaws of a 40-stamp mill. The only point that remains to be solved is: Will the rock pay? We are told that ore from the Alpi ledge crushed many years ago yielded \$3 per ton in free gold. From the favorable conditions of working, if it paid \$2 per ton throughout it would with present means of working leave a handsome margin of profit.

AMADOR GOLD MINE.—*Dispatch*, Dec. 22: Everything is progressing in good shape at this mine. In two weeks the connection will be made between the west shaft and the 250-foot level. At the mill the mortars and cam shaft are set, the battery painted, and the water-wheels placed in position.

GRAINGER.—This prospect is located near Pine Grove, and is owned by Silas Grainger, formerly of Jackson. A shaft has been sunk 80 feet on the ledge which is small, yet quite rich. About 20 tons of ore, taken from the shaft, was crushed some time since and yielded at the rate of \$25 per ton. A level has since been run from the bottom of the shaft, and a trial will soon be made of rock taken from the face of the tunnel.

COSMOPOLITAN.—The east crosscut is in 100 feet, 10-foot ore, and not yet to hanging-wall. The south drift is in 12 feet.

NORTH CALIFORNIA.—They are taking out ore from the west crosscut in this mine; have been cleaning out the Potosi ditch. The mill will be started up next week. Mr. Goodman has his Huntington mill in operation again, at the Overplus mine.

DRYTOWN CON.—This enterprise is being pushed right along. It is expected to begin work the first week in January. Three thousand feet of 10-inch pipe has been engaged; also a water hoist, same as that used at the North Star in Sutter creek. Geo. Phillips has started his gravel mine at Irish Hill; six men are employed. The water used is taken from the Plymouth ditch, and the debris goes into Buckeye valley; hence he is not subject to injunction by Sacramento river people.

NORTH STAR.—At this mine they are preparing to sink a winze on the ledge from the tunnel running south, as they are of the opinion that they are on top of the ledge. Seven-ninths of the original stockholders have signed an extension of the bond on the mine to the company; the other two-ninths refuse to extend.

WILDMAN.—At this mine they have developed a ledge of excellent ore, and intend sinking 100 feet deeper on same at once, and increase their mill to 20 stamps. At the Lincoln, work in the tunnel over the old shaft is progressing rapidly. The mill is kept running steadily now. Reports from the Stewart mine, up the creek, are very flattering; in fact, reports give it the flavor of a bonanza. The new mill has been started, and everything is working finely.

Calaveras.

RICH GULCH.—*Cor. Calaveras Chronicle*, Dec. 17: The Atwood is running in full blast, and has a force of about 50 men. The grading is about completed and a 20-stamp mill will soon be erected. A ten-stamp mill is being erected at the McGlew mine, also a boarding-house. They have about 15 men employed at present, but they intend increasing the number in a short time. The Ilex mine is closed down, but will start up again about the first of next month.

SOAP ROOT MINE.—*Calaveras Chronicle*, Dec. 22: This mine, situated in the West Point district, is undergoing development without intermission, preparatory to stopping. The south level is being run in order to tap the central chute. When this level is completed an upraise will be started in the end of the ore body, which is valued at \$200 per ton; thence the level will be continued to strike the Henry chute and an upraise effected at that point. At the same time a north level will be run, extending 100 feet, opening the north chute. The main hoisting shaft, which is 100 feet in depth, is centrally located to work the three chutes, it lying between the two on the north and being favorably located for the convenient working of machinery and the erection of buildings. There is a building 80x40 on the mine, and the combined power of a steam engine and water-wheel is used for pumping and hoisting. The mine is making a splendid showing at present.

RICH ROCK.—Edward Zumwalt and Leon Vandel, owners of the Victor mine on Esperanza creek, where they have been prospecting for the past year, have struck some rich ore. They have constructed an arastra which has been in operation for awhile, and the results have shown that they have been putting through rock yielding \$150 per ton.

EL TRIUNFO MINE.—This property is situated on Bear creek and is owned by parties in West Point. Operations will be resumed on it in the near future. This mine will prove to be a paying one when once opened, as present developments plainly show. It is favorably located to work by water-power, which fact adds greatly to its value.

El Dorado.

VOLCANOVILLE.—*Cor. Georgetown Gazette*, Dec. 20: The Fairchild at Mt. Gregory, owned by the Barklage Bros. and leased to Messrs. Brown, Ken-

ney & Stanton, will commence operations in a few days.

OLD BALLARD CLAIM.—This property adjoins the Mount Hope and will be operated this winter by Messrs. Kates, Knowlton & Co., who have made extensive preparations to fully open up what is considered a very valuable piece of property.

COOLEY CLAIM.—This is leased by Judge Edmondson and St. Clair Nye and has a very encouraging outlook. The work now in progress shows evidence of opening up a valuable claim in the very near future.

JOSEPHINE.—Both mine and mill are in full blast, giving employment to numerous men, and undoubtedly is paying the proprietors handsomely for the large investments of capital made to develop this valuable property.

MCCALL MINE.—On middle fork of American river. Over a dozen men are employed on this claim, and as soon as accommodations are complete the intentions are to increase the number. Day and night shifts are working at present.

GEN. HARRISON.—Situated on the south side of Buckeye hill, owned by R. & Austin Fairbanks, who are making ample preparations for extensive work when water is obtainable. Prospects are very encouraging for a profitable season's work.

FLORA MINE.—On this claim the lessees, Knox & Borella, are running a tunnel to strike a crevice which is expected to develop into a paying prospect. They are now using the waste water from the Josephine mill for prospecting purposes.

BONANZA CLAIM.—Located on the south side of the middle fork of American river. Is being worked by a company of capitalists who have a number of men employed in preparing for extensive work this winter, with very flattering prospects.

COCK ROBIN POINT MINE.—This property is owned by Thomas Natrass and Sacramento parties, who have expended during the past summer a considerable amount of money for the proper development of what is considered one of the most valuable claims in this section. Active operations will commence on the claim shortly, and under the experienced eye of Mr. Natrass bids fair to reimburse the owners for their outlay and leave them a handsome profit at the close of the season.

LAST CHANCE MINE AND MILL.—Under very unfavorable circumstances, lack of water being the principal drawback, a small quantity of quartz was run through the mill, showing very favorable results. With some needed alterations to machinery there is little doubt that a still better showing can be obtained. At present, the owners, Kane & Creagh, are undecided as to future operations on the property. Judging from the renewed activity this season, to be seen on every hand, the outlook in mining is more than encouraging.

Fresno.

A PROSPEROUS CAMP.—*Fresno Expositor*, Dec. 19: A. B. Chambers, an experienced prospector, assayer and miner, formerly of Tombstone district, Arizona, came to Fresno this summer, and was induced to visit the mining regions of the Upper San Joaquin in this county. A few weeks' search disclosed to him a find which promises to eclipse anything yet discovered in the southern Sierras. On Temperance Flat, about 35 miles northeast from here, he has a two-foot vein of auriferous ore that shows the gold thickly interspersed throughout the quartz. Both foot and hanging-walls are as perfectly defined as if shaped with trowel and float. Some specimens we have seen are of great richness, and Mr. Chambers assures us that the samples shown are but a fair average. A third interest was sold yesterday to J. G. Denning of San Francisco, one of the principal owners in the Fresno Milling Co., and a mill will be put on the property early in the spring. This claim is about a mile distant from the mill of A. Jackson, erected this season, and which has been pounding away on the quartz for two weeks past. The output of mineral from the mill is most satisfactory, and Mr. Jackson is enthusiastic about the outlook.

HILDRETH.—*Cor. Fresno Expositor*, Dec. 19: The Abbey mine is looking better than at any time during the past year. The drift on the 700-level is being driven ahead with all possible speed, disclosing a splendid body of high-grade ore, which from present indications promises to be one of the most valuable ore bodies ever discovered in the Abbey, from the fact that it seems to be a continuation of the immense ore chute on the tunnel level. The face of the main tunnel is also in rich ore, and the first level is looking fine. The stopes above the tunnel level are looking better at some points than they did two weeks ago, but will soon be exhausted, owing to the near approach to the surface. The Frances and James has been closed down indefinitely, causing considerable depression in business matters generally. The Jackson is working a small force of men. The Lillie has not resumed operations as yet, so the camp is mainly dependent on the Abbey, and there is only a small force employed by this company at present.

Inyo.

THE SODA INDUSTRY.—*Inyo Independent*, Dec. 22: At the soda works, at Keeler, 2000 tons of crude soda are now ready for purifying. Of this, 20 per cent, or 400 tons, will be bicarbonate of soda, worth \$70 per ton. The other constituents are worth \$30 per ton. The whole will therefore be worth \$76,000. The purifying is done by a process discovered and patented by Mr. B. F. Gray, superintendent of the works. This process is much more effective and cheaper than the old way of working. The force of men employed has recently been reduced; 21 men are now at work, but many more will be employed next spring. A great deal of work had to be done making tanks for purifying the soda; this is now nearly finished and purifying will begin in a few days. Thirty tons a day will be purified. The source of supply is Owens lake, and is inexhaustible. The business will certainly grow to large proportions and be of immense value.

Monterey.

LOS BURROS DISTRICT.—*Cor. Monterey Democrat*, Dec. 14: The Lost Child claim has run two tunnels and has also fine ore that turns out well. They are running a tunnel on the Fir Tree claim, also on the Little Ridge claim. Those two claims lie alongside of the Brewery claim, that a short time ago struck it so rich, and are now putting up a building for the purpose of working the claim for all it is worth in the spring. The Melville claim

has a tunnel run in about 90 feet, and is now getting out timber to push the tunnel ahead. There has been considerable work on the Oakland. On the Bushnell claim they are running a tunnel and have struck a small vein in slate that prospects. They also find considerable gold in the gulch, among which are some good-sized nuggets. The Cruikshank or Last Chance Mining Co. have about 200 tons of ore on the dump, and are running their mill night and day. They are drifting from their main tunnel on a 6½-foot ledge, from which they are taking out very rich ore. They are also pushing the tunnel ahead to strike another vein from which they have taken out rich ore on the surface of the ground. It would be well for some of the "pinch out" men to come and see the vein in the tunnel.

Los Angeles.

OIL.—*Newhall Times*, Dec. 22: There are 22 men now at work on the grade for well No. 7, at the Wyile. This promises to be a pretty rich oil section. No. 6 is now down a little over 400 feet; oil was struck at 400 feet, with indications for a splendid flow.

Nevada.

NORTH STAR MINE.—*Grass Valley Union*, Dec. 19: The ten new stamps in the North Star mill were started up on Monday for regular work, making the total crushing capacity of the mill 40 stamps. The increase in the number of stamps was rendered necessary by the large amount of ore the mine is producing, and which had accumulated to such an extent that it was found necessary to lay off a number of the men. The tribute rock had also largely accumulated so that 30 stamps could not dispose of it together with the company rock. The full head of 40 stamps will enable the mill to reduce 80 tons of ore per diem, and permit of more extensive exploitation of the mine, which is paying handsomely, and is good for large dividends. The main incline is now being sunk for the 19th level, which shows the energy which has been displayed by the company, which, since operating the mine, has sunk the incline from the 12th level to its present depth. The vein in the shaft is strong and of good milling quality. The plant on the North Star is not surpassed by that of any mine in the State in perfection of its machinery and convenience in manipulating the ores. To all appearances the mine has a long and profitable life before it.

IDAHO MINING CO.—The annual meeting of the Idaho Mining Co. was held on Monday evening, at which the reports of the officers of the operations of the Co. for the past year were submitted and a Board of five Directors was elected to serve for the ensuing year. The old board was re-elected consisting of John C. Coleman, Edward Coleman, M. P. O'Connor, E. C. Creller, and Geo. W. Hill. The board organized by the election of Edward Coleman as President and Superintendent; E. C. Creller, Vice-President; John C. Coleman, Treasurer; Geo. W. Hill, Secretary. The reports of the officers of the company have not been given out for publication, but it is understood that the product of the mine has been up to the usual average, and the dividends for the past year have amounted to about \$300,000. The mine continues to look well, and is yielding ore from the 13th to the 16th levels inclusive.

THE DELHI MINE.—*Grass Valley Union*, Dec. 22: Robert McMurray, who is the principal owner in the Delhi quartz mine, near Columbia Hill, was in town yesterday and said that recently very rich quartz had been struck in the lower tunnel of the mine, nearly every piece showing liberally in free gold. The width of the pay shoot on this level has not yet been determined, but if found to be as wide as on the level above it will add immensely to the value of the mine. The new find has doubled the product of the mine, which was previously large and profitable. Besides the quartz being rich in free gold, the sulphurets are of high grade, yielding an average of \$200 per ton. The sulphurets saved last month were alone of the value of \$70,000. The mine is worked cheaply, as it is opened by means of tunnels driven into the face of the hill at different elevations, thus securing drainage without pumping, and the milling is done by water-power, which is ample for all purposes and cheap. As an evidence of the high grade of the quartz and the profitable working of the mine, Mr. McMurray said out of a yield of \$250,000 taken out within a stated time dividends of \$210,000 were paid, and that whatever might be the future of the mine it has been a very profitable property to the company. The owners in the Delhi are also interested in the Enterprise, which is showing up well and has given profitable crushings, and to all appearance is going to be a successful rival to the Delhi. These quartz operations are encouraging to the Columbia Hill region, and will serve to stimulate energetic prospecting and give encouragement that other valuable mines will be opened up.

ABOUT COMPLETED.—*Grass Valley Union*, Dec. 23: The additional stamps at the North Star mine are now running, and save a few tightenings of screws, a little fixing of bearings, they are now all in running order. Mr. J. H. Gates has been superintending the work for J. B. White & Co., sub-contractors, of San Francisco, and he has done his work well. Mr. Gates has placed the stamps and all their surroundings just in the right shape, and has proved himself a master of his profession. The batteries, Frue concentrators, etc., are all in line, and the job is a successful one.

Placer.

THE PIONEER MILL.—*Grass Valley Union*, Dec. 20: The 20-stamp mill which is being built by Wm. S. May of this place on the Pioneer mine, at Humboldt canyon, will be completed and in running order in about two weeks. It has been a big job to build this mill, as the place is difficult of access for teams, and a large part of the machinery had to be taken there from Alta by pack trains, and the supplies for the workmen were carried by the same route. The Pioneer is a master lode, being 14 feet between walls, and yields a great deal of high-grade free-milling ore. The lode has been penetrated at several points by tunnels, and the ore can be run out by tramway on cars directly to the mill. A good deal of development-work has been done on the mine, and the mill will have a large supply of ore to commence on. The owners of the Pioneer are Jas. G. Fair and A. E. Davis of San Francisco, who have in this mine what is believed to be a great property. The present mill is said to be only a commencement in the way of milling facilities, and probably next season from 40 to 60

stamps more will be added. The owners intend working the mine on a large scale.

HOGSBACK.—*Placer Republican*, Dec. 14: W. C. Ralston, superintendent of the Hogsback mine, went to Georgetown to-day to secure an extension of the bond on the mine for 60 days. The tunnel has been pushed ahead, and at a distance of 173 feet from the point where it entered the mine, ran into gravel. This continued for 43 feet, when to the surprise of all it has broken through into another body of cement. Two shafts are being sunk to find the channel.

RED POINT.—The output at the Red Point mine this month will be at least 500 ounces, and the company will declare its first dividend in Paris on Christmas Day. The dividend will probably be small, but it is a pretty good showing for a new mine, and all from development work at that.

MORNING STAR.—During the last four months Morning Star mine, near Iowa Hill, cleaned up over \$8600 at an expense of about \$1700. The gravel crushed was taken out in development work.

San Diego.

ESCONDIDO GOLD MINE.—*San Diego Times*, Dec. 19: For the past six weeks A. K. Cravat, president of the company, has devoted most of his time to superintending the work. He has eight men at work, all except one having an interest in the company, and who have unbounded faith in the enterprise. They struck some rich pockets last week, and were greatly encouraged. No matter in what direction they work, or drift, the vein shows up distinctly and is well defined. There is no pinching out, and it shows the best results below or at the water-line; for this reason they are anxious to get some new machinery, in order to pump the water out, that they may go down with the main shaft. This week they have shipped a car of ore to the National City Reduction Works to be milled.

Shasta.

CLEANUP.—*Redding Free Press*, Dec. 19: I. M. Wiley, who is down from Delta, informs us that the Murray-Finley Co. cleaned up about \$1500 from a ten-days' run with an arastra. He also states that a new discovery has been made, in which he is interested, which promises to be very rich. This portion of Shasta county, including the Soda creek mines, seems to be turning out quite well.

Sierra.

PROMISING.—*Nevada Transcript*, Dec. 20: F. A. Gourley, who came down two days ago from Sierra county, says that the two quartz ledges ten miles from Gibsonville, in which R. E. Robinson, formerly of this city, holds a sixth interest, are panning out most satisfactorily. The veins are large, and the bulk of the ore pays about \$15 a ton, while the good-sized strata of sulphuret ore that yields \$200 a ton. Mrs. Robinson, who went up there a few weeks ago, is conducting the company boarding-house and making money at it.

GOLD BLUFF.—*Mountain Messenger*, Dec. 22: Work at Gold Bluff has pretty much ceased for the winter. A few men will be kept at work, it is said.

Plumas.

SPANISH RANCH.—*Cor. Plumas National*, Dec. 17: The Edman mine is doing well. Mr. Edman is about to put up a new mill at his place. This is the model mine of Plumas. Mr. Abe Bolyar, of the Bolyar mine, has run a new tunnel into the channel. Although it cost a good round sum of money, he is now realizing handsomely upon his investment. Mat Knielvel has struck good pay in his Summit mine. Challen & Sons are running a long tunnel into the mountain at Sharp's ravine. They expect to strike gravel this winter. Messrs. Wampler and Hickman, south of Challen's mine, are in 500 feet in their bedrock tunnel. The bedrock is very hard and it will cost the boys a mint of money. They expect to strike gravel any day.

NEVADA.

Washoe District.

CROWN POINT.—*Virginia Enterprise*, Dec. 22: No. 3 crosscut, 700 level, is in 26 feet. The face is in porphyry, clay and streaks of quartz. The 700 raise is up 45 feet above the track. The top of the raise is in good ore. The 800 level east crosscut No. 1 is in 40 feet. Ten feet from the face we passed through a clay wall two feet thick, standing vertical and running northeast and southwest. Since then the drift has been in quartz giving good assays.

CON. IMPERIAL.—East crosscut No. 1 is out a distance of 57 feet from the main north lateral drift, having been advanced 12 feet during the week. The face continues in vein material of no value.

CHALLENGE CON.—The Joint Confidence raise from the 1300 level to connect with the 1200 level is now up 22 feet, having been advanced eight feet during the week. The top of this raise shows some ore of fair quality. Have shipped during the week to the Brunswick mill for reduction 113 tons of ore, the average battery sample of which shows a value of \$25.49 per ton.

BELCHER.—Have now repaired and cleaned out 195 feet of the 1100 level north drift. The joint 1100 south drift advanced 56 feet during the week and is now out 195 feet.

SEG. BELCHER.—The joint 1100 south drift is now out 195 feet, having advanced 56 feet during the week, or at the rate of 8 feet per day. There are still 120 feet separating the face of the drift from the Segregated Belcher and Mides north line.

CONFIDENCE.—Have shipped during the week to the Brunswick mill for reduction 518 tons of ore, the average battery sample of which shows a value of \$25.49 per ton.

JUSTICE.—The raise from the north drift is up 32 feet. The top of the raise is in five feet in width of good ore. The west drift was advanced 18 feet during the week, and is now out 216 feet. Are still cutting out the 370 level shaft station.

WEST COMSTOCK.—The West Comstock Mining Co. has struck some rich ore 200 feet from the surface. From two assays taken from the ledge, No. 1 went \$43.40 in silver and \$35.10 in gold, and No. 2 went \$75.10 in silver and \$35.10 in gold. The mine is under the charge of Andrew Bean, an old-time miner of the Comstock.

SAVAGE.—On the 500 level the west drift from the station was extended 32 feet; total length, 312 feet. Are extracting ore from east crosscut No. 1 and from

the old stopes on this level. Are also extracting ore from east crosscuts Nos. 2 and 3 on the 600 level, and from the old stopes on the 750 level. During the week hoisted 336 tons of ore and shipped to the Rock Point mill 481 tons, and have reduced 470 tons. The average battery assay of the same was \$19.50 per ton. Have bullion at the mill amounting to \$11,923.17.

BULLION.—The winze below the 640 level has been sunk 54 feet. The machinery is running well.

YELLOW JACKET.—Are doing good prospecting work in different parts of the mine, and are shipping daily 100 tons of gold ore to the Santiago mill, which yields better returns than formerly.

SCORPION.—The west crosscut on the 300 level is out 335 feet.

ANDES.—The usual progress is making on the 240 and 350 levels.

SCORPION.—The usual amount of prospecting work is in progress.

HALE & NORCROSS.—On the 500 level the main west drift was extended 25 feet, its total length from the shaft being 680 feet. This drift continues in the same good quality of ore mentioned in the last report, which are stopping and sending to the mill. On the 600 level the west drift was extended 30 feet; total length from the chute, 105 feet. On the 800 level the northeast crosscut from the face of the north drift was extended 39 feet; total length, 55 feet; and the southeast crosscut from the south drift was extended 20 feet; total length, 70 feet. Are extracting ore from the stopes between the 500 and 700 levels, which continues to yield the usual quantity of good ore. During the week have hoisted 1024 tons of pay-ore from the 500 and 700 levels, and have shipped to the Mexican mill 898 tons. Average battery assay, \$28.18 per ton. Have bullion on hand and previously shipped for the month amounting to \$41,534.72.

GOULD & CURRY.—200 level: In the north drift, at a point 104 feet from west crosscut No. 1, west crosscut No. 2 has been advanced 30 feet. Formation porphyry with streaks of quartz.

ALPHA.—The north lateral drift on the 500 level is still in clay and quartz. The south lateral drift is in ore that assays from \$15 to \$20 a ton.

POTOSI.—The south drift on the 650 level is still being advanced in clay and porphyry.

CHOLLAR.—The raise from the 650 level north drift is in quartz showing value. On the 750 and 850 levels the west drifts are still in clay and quartz. Half the Nevada mill is being run on Chollar ore, the machinery being run by the surface Pelton water-wheels. Electricians are at work trying to transmit the power generated by six Pelton water-wheels on the 1600 level of the Chollar shaft to the Nevada mill.

ALTA.—Started the mill Thursday, running the pulp over two concentrators before amalgamation, and it works well, so far as can be determined at this early date.

Pioche District.

BUSINESS REVIVAL.—*Record*, Dec. 15: Since the arrival of W. S. Godbe there has been an activity noticeable in the way of preparations for future mining and reduction operations that cannot be otherwise than gratifying to the long-waiting Pioche public. We learn that it is the intention of the P. C. Company to proceed at once with the erection of a roasting and dry concentrating plant, in connection with its present leaching works, the tanks of which are to be lined with sheet lead, and the works otherwise got in readiness for the treatment of ores. We also understand that arrangements have been completed whereby the R. & E. mine is to be started up in the near future; the work of retimbering the shaft will soon begin. The large bodies of ore in this mine from what is known as the black ledge can be treated in the proposed works to advantage; the galena and zinc blende can be separated from the gangue and worked separately, as they should be. When this is done, it will be but a stepping-stone, as it were, to other and even more important developments.

Oseola District.

PLACERS.—*Eureka Sentinel*, Dec. 15: The placer mines of Oseola are still being successfully worked. On the mountain, on the slope of which these gravel diggings are situated, are two or three immense veins, which show a good milling average in free gold. Some enormously rich pockets will undoubtedly be found in these veins when they come to be systematically worked. In the placer diggings, a little below, they a few years ago found a mass of quartz that contained over \$5000 in pure gold.

Silver Peak District.

CLOSED DOWN.—*Walker Lake Bulletin*, Dec. 19: The Silver Peak mines have been closed down for the winter. Messrs. Brunton & Taylor, managers, and J. W. Moffat, civil engineer, passed through en route to Denver on Saturday. Mr. Brunton will cross the Atlantic and report progress to the owners, and is confident that work will be resumed with renewed vigor in the early spring.

ARIZONA.

ORE SHIPMENT.—*Clifton Clarion*, Dec. 19: Jenkins & Paxton shipped this morning from the Pittsburgh claim, owned by Grant, Baxter, Whittington & Adams, 324 sacks of ore consigned to sampling works in Colorado. It is claimed the rock will run \$100 and upward.

COPPER.—In copper properties also an active interest is being taken in the district. We are informed that the well-known Carrasco group of mines near Morenci have been sold for \$10,000 cash, and that payment will be made within the next ten days. The purchasers are New York parties, who certainly have got hold of an excellent property, and one which for some time past has been a steady producer of an excellent quality of ore. It is further said that negotiations are pending for the purchase of the Higby group of mines, also in the vicinity of Morenci. It is claimed they are now in a condition to produce a large and unknown quantity of high-grade ore of a most desirable quality—carbonates.

VARIOUS CAMPS.—*Prescott Journal-Miner*, Dec. 13: Biglow & Smith are doing assessment work on a claim in Maple gulch. N. Johnson, a placer miner on the Hassayampa, brought in several dollars worth of gold dust yesterday. Shull & Austin have a six-horse team regularly employed in transporting

supplies to the Congress mine, making a round trip every six days. J. M. W. Moore has been appointed general manager of the sampling works of the Arizona Ore Co. Reports from the Centennial district say that Harry Watton has made a wonderfully rich strike about four miles from Centennial camp. It is said to be a large ledge of free gold. Dan Hatz has nearly a carload of ore ready for shipment from the Ruby and Buena Vista mines on Slate creek. The ore contains gold, silver and copper, and runs from \$80 to \$100 per ton. Six or eight teams of from six to twelve animals each, pulled out to-day loaded with mining machinery. Among the number were several bored for the Oro Bella company's camp in the Bradshaws. Ed Wager has recently struck some horn silver on his El Dorado mine at Tip Top. The El Dorado has been worked for a number of years, and is now paying better than at any time before. W. A. Rowe has a pack train engaged in packing ore from the Original Davis mine on Slate creek to Prescott, for shipment to Colorado smelters. Ore works from \$80 to \$100 per ton, and he has 20 tons out ready for shipment. John McDermid has taken a contract for running a tunnel 100 feet in the Storm Cloud mine, and Thomas Williams and J. Brown have taken a contract for sinking a 70-foot shaft on the same property. Fred Sattes was in from the Alligator mine yesterday, for supplies. This mine is opening up into a veritable bonanza. It has already produced several thousand dollars in gold, and there is as much in sight now as has been taken from it. Twelve men are now employed on the Storm Cloud, and the work of developing this and other properties adjacent, owned by the same company, will be pushed rapidly, and it is the intention to erect a mill for the reduction of the ores in the spring. A superstition exists among many miners that a year ending with nine is a successful and prosperous one for that industry. Whether the omen is a good one or not, the mining outlook for this section never looked so favorable as it does at the present time for the year 1889.

COPPER BULLION.—*Florence Enterprise*, Dec. 15: From Mr. E. W. Haskin it is learned that the first carload of copper and matte sent forward by the Atlas Mining Co. of Red Rock, left that station last Saturday for New York City. The shipment weighed 33,000 pounds, and the copper was about 95 fine, carrying about 36 ounces of silver and \$4 in gold to the ton; the matte was 75 fine, carrying 40 ounces silver and \$7 gold per ton. Another carload of matte—about 35,000 pounds—was also shipped on Thursday of this week, and the regular shipments will follow. The shaft on the Caledonia mine, 477, 60 feet deep, is all the way down in good smelting ore. About 20 men are employed in the mine and at the furnace. The company expect to build a large furnace of 125 tons capacity, in a short time. A portion of the material has already been ordered in San Francisco.

SILVER KING NOTES.—Considerable assessment work is being done on some of the claims in this vicinity, which is a strong indication that there is no lack of faith in the future prosperity of this corner of the county. The contract for the work on the South King Co.'s claims has been secured by Col. Robt. Williams and the work will be pushed to completion as speedily as possible. The excitement in this end of the county this week is in Final and immediate neighborhood. The parties who held the bond on the Blackbird mine are in Final and it is rumored for the purpose of making the final arrangements concerning the transfer of this property. From all accounts the mine is a valuable piece of property. R. T. O'Donnell, P. C. Cumerford and Nelson Walker each paid a visit to Reymert camp this week, and from all accounts affairs are prosperous there.

COLORADO.

CRESTED BUTTE.—*Elk Mountain Pilot*, Dec. 20: We are very strongly of the opinion that next summer we will witness a revival in mining never before experienced in this section. We had a boom in 1880, but that was a tenderfoot boom. Foolhardy people rushed in here and frantically threw their money into holes in the ground, and because it did not yield to them millions, so to speak, they rushed out and cried mining is a fraud in general and more particularly in Gunnison county. It takes a long time for any country to recover from such inflated and overrated tendency, but we are thankful to know that recovering we are, and right fast, too. The outcrop is here, and the veins and ledges just as strong or stronger than can be found in any mining locality. The Great Eastern lode in Irwin is showing up well; it is being worked under a lease by Henry Panter. This claim is east and parallel with the Forest Queen mine, and something remarkable. It is a very dry mine. Mr. Panter has sunk a new shaft about 50 feet, and is getting some very rich ruby silver. An assay the other day run over 600 ounces, and while Mr. Panter is getting a little of this kind of ore, he is getting considerable concentrating ore. The leasers on the Gem are working away with some encouragement. They are drifting from the shaft in a northeast direction, and are hopeful of getting mineral very soon. This claim is on the north end of the Forest Queen. The Forest Queen is working a force of 15 and 20 men, and are driving ahead on the lower tunnel, having passed the shaft some 150 feet.

MONTANA.

AROUND DEER LODGE.—*New Northwest*, Dec. 21: The owners of the Empire State lode—Conrad Kohrs, Peter Lansing and C. P. H. Bielenberg—contemplate developing it in the spring. They have brought down some good ore lately and the lead is a strong one. Nothing definite is yet known in relation to St. Louis parties working the Mountain Lion. Mr. Gable writes the outlook was very encouraging. We mentioned some time since the shipment of a carload of ore by W. P. Emery, from the galena and silver camp eight miles east of town. We have not learned the returns therefrom, but a few days ago Messrs. John Devlin and Joseph Peterson shipped ten tons of first-class and two tons of second-class ore from the same camp. It was sold to the Butte Sampling Works, the first-class netting \$71.27, and the second class \$16 per ton, the purchaser paying railroad freight. It cost \$5 per ton to extract the ore and \$3.50 per ton to haul it to the Deer Lodge depot, leaving the owners \$642.70 above all costs and expenses. This is pretty good for what was practically float rock. Work is

progressing very favorably on the Champion shaft on the Lily, averaging 11 feet per week, which will carry it 100 feet by Feb. 15th. Work has now commenced on the east level at the 250-foot station, and it will soon be shown up what lies in that direction. Ore is also being taken out on the west 250-foot level. It is really one of the finest developments ever made in Montana; and if a body of ore is struck at 350 feet like that at 250 feet, it will surpass any mine ever opened in the Territory.

BELT MOUNTAIN.—*Great Falls Tribune*, Dec. 14: Prof. Mortson has returned from Wolf creek. He reports the mines in full activity. New strikes are being made almost daily, both on Dry and Running Wolf. On Dry Wolf preparations are being made for sluicing on the placer claims during the spring. A force of men is working on the Higby and Pierce claims to great advantage. Several new claims have been located. At the head of Running Wolf, Swingley, Sutton & Co. are pushing work vigorously. About half a mile below their claims Briggs & Co. will develop their property through the winter. The Morston Woodhurst shows a larger body of ore than ever. Still lower down the gulch, Woodhurst, Owens, Kendall, and Mix have made new locations. A road has been completed along nearly the whole length of the gulch. Heavy shipments of ore are coming from there to the smelter, and will be here in a few days. A great many teamsters are loading ore at the mines at present. Prof. Mortson says that the predictions made last summer by Messrs. Eilers and Enrich in regard to the finding of carbonate deposits at the porphyry contacts in the Belt mountains are now being realized. This is a matter of considerable importance as regards the future mineral supply. These carbonates can be mined and reduced more readily than other ores in this region. The miners are all hopeful and confident that the Belt mountain camps will be lively during the coming spring.

DAKOTA.

RUBY BELL.—*Deadwood Pioneer*, Dec. 20: The Ruby Bell Co. has a force at work extracting ore from the face of the tunnel. The ore is high grade, a good deal of it showing a quantity of free gold. Surveys of underground workings and developments of the Buxton Co. will be made by Engineer White during the present week. Actual surveys show the Golden Reward Co. has a breast of ore in sight 150 feet long and 8 feet high. Actual samples prove the average value of the ore to be \$30 per ton. It is stated that there are at present a greater number of men employed in the mines of Bald mountain and Ruby basin than ever before. There is not one vacant cabin in either of the camps, and every boarding-house is crowded to its utmost capacity. At Carr's place men are sleeping in stables for want of more comfortable lodging. The Big Chief Co. has commenced active operations on their property, which will be continued all winter. This company has done a large amount of work already, and intend to continue until they can produce paying ore, of which they have a large body.

UTAH.

TINTIC DISTRICT.—*Cor. Salt Lake Tribune*, Dec. 17: Tintic district is doing better in the line of shipping ore than ever before. The first half of the year was comparatively quiet, but the bulk of ore shipments the past six months have been constantly piling up, so that now the Salt Lake & Western is bringing out about 20 carloads per day. Among these shipments the past three months was about 2000 tons of pulp or tailings from the old Mammoth works at Tintic. These tailings were shipped to Denver, but now they are being worked by a leaching process. The iron mines are sending fluxing ore to Montana at the rate of two or three carloads per day. In looking into the ore shipments from this district, it is not pleasing to learn that the great bulk is going outside of Utah for reduction. The policy which makes it to the interest of ore-producers to sell outside is not favorable to building up the industries in this Territory. The fault seems to be chiefly chargeable to the railways in offering better rates for carrying away our ore than for encouraging our home smelters. The Bullion, Beck & California Co. is driving ahead, opening new levels and developing large bodies of ore ready for stopping, and at the same time is sending out ore regularly. This property appears to constantly grow in extent as the crosscuts and drifts are pushed ahead, while it holds out fully in going down. The Eureka Hill property is shipping more than ever before, and of course employs a larger force of men. The Centennial-Eureka made a small shipment in May, and began regular work in August. The record made since that date is certainly good. The Gemini company is putting up fine hoisting works on their Keystone property and will have them in full operation by the last of this month. This will give four large shippers from Eureka, all being located on that great mineral lode and in direct line with each other. Mammoth Hollow is doing well and shipments are regular. The Mammoth is developing finely, there being ore in all the levels and crosscuts. The iron mines are shipping more than ever before, part of which goes to Montana.

AT THE HORN SILVER.—Around the Horn Silver at Frisco there is an appearance of a perpetual Sunday. A visitor this week found an engineer at the small shaft, an official was in the assay office, and a lone man was in the blacksmith shop watching the dying embers of the forge. The doors of the big hoisting works were all closed, and the only sign of life about it was smoke coming from the boiler stack and the small noise of escaping steam. The only information that could be elicited was that 20 men were working down the small shaft, and as many more in the big one; the former being 400 feet deep, including an incline, and the latter 1300 feet, and that winzes had been sunk still deeper from the lowest level. Everybody about Frisco either knew nothing about the workings in the mine or else their lips were sealed. Some ventured the expression of a hope that with the New Year there would come a change of management and better days for the mine and camp.

NEW MEXICO.

DEVELOPMENT WORK.—*Silver City Enterprise*, Dec. 20: Two bars of bullion, the production of the recent mill-run at Telegraph, were brought in Friday

evening last. The bullion is .998 fine, and is valued at \$1700. The parties who purchased O'Connor & Duncan's interest in the Telegraph mines are expected to arrive here shortly. They will resume operations at the mines. Work will be commenced on the Rose mine at Bullard's Peak about January 1st. The Rose has generally paid her way and has produced a great deal of ore worth from \$5 to \$10 per pound. General Manager W. C. Hadley of the Silver Mill Co. of Lake Valley has five machinists employed in repairing the old mill at Lake Valley and putting in place the new machinery. James Dodd and Mat Miller returned from El Paso with the returns of a shipment of ore from the Alhambra. They were well satisfied with the returns and also the treatment they received. The Deep Down mill starts up on Monday next. The contractors are ahead sufficiently to keep the mill going steadily. The contractors state that they can take out the 5000 tons of ore, for which they are under contract, above the first level. Sinking and development is being continued. Judge Sloan of Santa Fe, who was in the city last week, is interested in a new electric process for treating ore, the expense of which will not exceed \$1 per ton. He is confident that \$5 ore can be milled and worked by his process at a profit. Thos. B. Peby returned from New York last week and informs the *Enterprise* that his company has reorganized and is now known as the Minibres Consolidated Mining Company, Mr. Peby, of course, surrendering his lease on the property. He is interested in the company and will run the property as the company's agent. The mill is being thoroughly overhauled and repaired at an expense of about \$10,000.

COOK'S PEAK.—*Silver City Enterprise*, Dec. 21: James Martin has been spending a few days in this city. He hails from Cook's Peak, where he is in charge of the Graphic works. While there has been very little said of this camp, it is certainly one of the most promising in the Southwest. There are about 40 men at work there, the majority of whom are working on their own property. The mines of the camp have been good producers from the surface, all of the owners having more than made wages while developing their properties. The ore runs very high in galena, and the most of it averages about 100 ounces in silver. It is a desirable ore for smelting. Mr. Martin informs the *Enterprise* that work on the Graphic has progressed steadily and that the mine is now in fine shape and looking better than at any time in its history. The main shaft has now reached a depth of 165 feet, and will be continued to 220 before crosscutting again. Several drifts have been run. During the past year Cook's Peak has probably shipped more cars of ore than any other camp in the county outside of those mining iron and copper. It might also be said that the camp, during the past year, has also made a more steady and healthy progress than any other new camp in the country. There are a large number of mines from which ore has been shipped with more or less regularity than any camp—except Pinos Altos, Kingston and Hermosa—and yet it is comparatively a new district, and the mines have been opened up by the original locators, without the aid of outside capital. It is sure to be one of the best camps in the Territory within two years.

OREGON.

THE TOM PAINE.—*Bedrock Democrat*, Dec. 19: J. W. Young returned Sunday evening from Portland, where he perfected every arrangement for operating the Tom Paine mine at Pocahontas on an extensive scale. The fact that Mr. Geo. B. Markle, vice-president of the Oregon National bank, and one of the wealthiest men in Oregon, has become one of the principal owners of the property is a sufficient guarantee that the Tom Paine will take front rank as a dividend-paying property. We are informed that a steam-stamp mill has been purchased at the foundry of Smith Bros. & Watson, in Portland, and has been shipped and will arrive here at once and be erected on the mine.

FROM SPARTA.—Wm. Ainsworth gives us a few items of interest from that camp. The Del Monte group of mines continue to be developed under the supervision of Jay Guy Lewis, and are making a fine showing. This property is now in the hands of Eastern capitalists, and a sale is pending. It is expected that these mines will be operated extensively in the spring. Arrangements are being made for the erection of a mill on the Little Pittsburg property, and Messrs. McCoy, Brophy and others who own the mine are in Sparta at the present time making the necessary preparations. It is said these parties have laid out a new townsite at the head of Lone Pine gulch, south of Sparta. The quartz and placer mines in the vicinity will afford the means of support for a number of people and build up a good camp. The new town would be nearer to Baker City by several miles than Sparta, and we presume this is the main object in the new townsite.

BAKER COUNTY MINES.—*Bedrock Democrat*, Dec. 12: The New York company, represented by Mr. John Williams of this city, and owners of the North Pole mine at Cracker creek and the Big Aleck mine in McCord's gulch, five miles west of this city, is making preparations for extensive work on both these properties. The mill machinery for the Eureka and Excelsior mines at Cracker creek is now being transported by team from this city to the mines, to be on the ground ready for its erection early in the spring. At the Columbia mine at Cracker creek there are about 25 men on the payroll and the mine is showing up splendidly. The Gray Eagle will be developed to the extent of several hundred feet in the spring, as work will continue on it all winter. The La Bellevue is turning out thousands of pounds of concentrates for shipment to Denver. The mines of Isaac Kloop, in the near vicinity of La Bellevue, are being developed, and work on them will be continued all winter. We understand that Geo. B. Markle, vice-president of the Oregon National Bank of Portland, is one of the purchasers of the Tom Paine mine in Pocahontas district, and that this property will be put under a rigid process of development at once and a mill erected yet this winter. The Little Pittsburg at Sparta is being developed, and the chances are very favorable for a mill to be erected on the mine at an early day. Taken altogether, the mines of Sparta look well. The Sanger is turning out its thousands of dollars monthly in bullion, and new ore chutes are being found daily. The Sanger is a great mine and will continue to be for years to come.

MECHANICAL PROGRESS.

Rope Transmission.

For transmission of power over long distances from 100 to 1000 feet or more, ropes are coming more into use than formerly. They have been used at widely different places for many years, but it is only quite recently that their value has been more fully recognized as an economical, convenient and efficient means for accomplishing the end for which they have thus been brought into use.

The system was first introduced into English shops and manufactories, where its advocates have long claimed for it less cost than leather belts and better adhesion. Moreover, when in exposed locations, water will not damage ropes, and they are not subject to such sudden giving out as leather belts. Any little beginning of weakness may be more readily observed and provided against. Another important advantage is that power can be readily added to shafting by putting on additional ropes. In case of a rope breaking, only the shafting and machinery driven by that rope alone has to stop; whereas, if a large belt transmitter was used, the entire mill or factory has to stop until the break is repaired.

As prime transmitters between the central power and the general system of shafting, they are generally considered to hold a decided advantage over either gearing or leather belts.

One instance is noted where 700 horse-power is transmitted by 20 ropes being run in V-shaped channels on a single drum 12 feet in diameter conveying power to wheels seven feet in diameter—two-inch diameter ropes being used.

English manufacturers have never made such a general use of belts for transmitters as has been done in this country. The life of a rope is much shorter than that of a belt—about seven or eight years, while a good leather belt properly made up and of proper size for the duty required of it, will sometimes last for a lifetime. The difference in wear is about compensated for by the less cost of the rope.

English manufacturers have never been partial to belts, and were for many years quite incredulous as to the possibility of conveying high power by belting, as is done in this country. Gearing is much more generally used there than here. American belt manufacturers have furnished many factories in England and on the continent with heavy driving belts.

The results which have been obtained with ropes have not always been of uniform excellence, mainly, however, because designers have in some cases failed to recognize properly the requirements of good working. Where rope-driving has been tried and has failed, examination has almost invariably revealed a disregard of correct principles of construction, and has shown nothing calculated to detract from the favor in which the system is held, especially where a continuous high speed is required. In mill districts, particularly, engineers have not been slow to avail themselves of these advantages, and with the cotton rope most satisfactory performances are recorded. The field of usefulness of rope-gearing is gradually being extended.

Wire-Rope Transmission.

With wire-rope transmissions for outdoor use, and long spans, serious trouble has been found to arise from excessive vibrations of the rope. Careful management, however, has had the effect of almost entirely eliminating these disturbing influences, and instances are now not rare where very long spans are used with perfect satisfaction.

In this country there are a number of instances where distances from 300 to 1000 feet or more are used, notably at Sihley College, Ithaca, N. Y., where the span is fully 1100 feet. In Europe wire ropes are found practicable and advantageous for much greater distances, ranging all the way from 50 feet up to several miles. As an example of long transmission, that furnished in Schaffhausen, Switzerland, at the falls of the Rhine, is quite notable. There some 800-horse power is carried diagonally across the live and extended a distance of two miles, being there distributed among the 50 different manufacturing establishments, situated in every imaginable position and embracing all the varied arrangements of changing directions. This use of wire ropes has been increasingly produced in Europe, the transmission coming into use at the point where a belt or shafting becomes of too great length to be employed profitably.

Prof. Osborne Reynolds says that steel ropes as transmitters of power have a great advantage over shafts, because the stress on the surface will be uniform, the velocity will be uniform, and may be at least 10 to 15 times as great as with shafts, say 100 feet per second; the rope is carried on pulleys, which may be at distances of 500 or 600 feet, so that the coefficient of friction will not be more than 0.015 instead of 0.04.

A recent correspondent of the *American Machinist*, who has had a very large experience in rope-driving, prefers pulleys about $\frac{3}{4}$ feet in diameter, with end of wood to the rope. After using many shapes of grooves, he gives preference to 55° pitch. A small clip of the rope causes much greater wear than loss from supposed wedging in a sharp groove. He soaks his ropes in warm tar.

THE STEEL SLEEPER BUSINESS.—A very great activity seems just now to mark the steel-sleeper business in England, and the competition for the orders offering is keen. Some of the Staffordshire steel-masters were recently in receipt of inquiries for 15,000 tons of sleepers for narrow gauge for export. But Staffordshire does not particularly lay herself out for the sleeper trade, and the inquiries have been passed on elsewhere. A contract for Bungal and Nagpur has recently been given out at from \$23.75 to \$24.15. In this country attempts have been made to a considerable extent to substitute metal for wooden ties on railroads, but it does not yet appear that the right kind of tie has been invented. Wood is cheaper here than in England and possesses the quality of yielding in just about the right degree, and a metal tie should come as near to the same degree of yielding as possible. The way the railroads are using up the stock of available timber should be an incentive to some ingenious inventor to bring out a metal tie equal to a wooden one. An iron tie experiment is to be made by the New York Central, which has placed a contract for 800 ties. They will be laid on the new Harlem tracks.

WHAT AN AMERICAN MANUFACTURER IS DOING IN CHINA.—According to the *Lowell Times*, Albert Whitney Danforth of that city is largely interested in a manufacturing enterprise in China. Recently the Lowell machine shop and Providence machine works have been shipping machinery, and Brown Bros. & Co. of Providence mill supplies to the Shanghai Cotton-Mill Company, whose buildings will be all ready to commence operations at once on its arrival. Power will be furnished by a 500-horse power engine, in the construction of which Mr. Corliss took great interest and gave it much personal attention. The company has a monopoly and is under imperial protection. Its works are on the Wangpoo river, near its junction with the Woosung, and about three miles from the "foreign settlements" of Shanghai. The Franco-Chinese war and some other events seriously embarrassed the Shanghai Cotton Cloth Company, and it has taken some time to recover. The company retained Mr. Danforth to care for its property and interests. He is in excellent health and a "heavy weight" physically.

HEATING ROLLING-MILL ROLLS.—London *Engineering* illustrates and describes in a recent issue a device for heating roller-mill rolls by gas. The gas is burned in jets, which are uniformly distributed the whole length of the rolls at each side. When these jets are lighted and the machine is put into slow rotation, every part of each roll is gradually and uniformly heated without the production of any dangerous strains. This method of heating rolls is said to be in use by Messrs. Bolckow, Vaughan & Co., the Downais Iron Company and the steel company of Scotland. In one mill the average life of the rolls previous to the application of the gas was 793 days, and after the application 342 days. The device is the invention of Franklin Hilton of Middlesboro'-on-Tees.

A NEW BUILDING CEMENT.—London *Industries* says that the cement by which many stone buildings in Paris have been renovated is likely to prove useful in repairing the foundations for machinery. The powder which forms the basis of the cement is composed of two parts oxide of zinc, two of crushed hard limestone, and one of pulverized grit, together with a certain proportion of ochre as a coloring agent. The liquid with which this powder is to be mixed consists of a saturated solution of six parts of zinc in commercial muriatic acid, to which is added one part of sal-ammoniac; this solution is diluted with two-thirds of its volume of water. A mixture of one pound of the powder to $\frac{2}{3}$ pint of the liquid forms a cement which hardens quickly and is of great strength.

SPONTANEOUS COMBUSTION.—A recent case is reported where a painter engaged in a mill removed his overalls at 6 P. M. to go home. At 8:30 the watchmen, discovering smoke in the mill, summoned the engineer, and together they searched the premises carefully, tracing the smoke to a small room in which the overalls were discovered, and in one pocket was a bunch of greasy waste which had ignited. This goes to prove that spontaneous combustion will ensue in less than three hours if the conditions are all right.

A NEW WOODEN PULLEY has been devised on an entirely new principle. The center is of cast iron, and the rim is of wood, and it is made in two parts. It is claimed that by its use better belt friction is obtained; and a saving in power is realized, as the spokes are so formed as to offer little resistance to the motion. By a novel and effective paper hushing, keys and set screws are entirely done away with, and the grip upon the shafting is perfect.

OUR STEEL RAIL INDUSTRY.—No steel rails were made in this country 20 years ago, and the imported rail cost \$120 per ton. Now we produce 1,764,000 tons, and rails sell at \$30 per ton.

STEEL AS CHEAP AS IRON.—A Pittsburg firm has offered soft steel for structural use at the same price as iron.

COAL loses from 10 to 40 per cent of its evaporative power if exposed to the effects of sunshine and rain.

SCIENTIFIC PROGRESS.

Terrible Electric Storm at Sea.

Electricity sometimes gives us terrible displays of its presence, and energy and phenomena often occur which puzzle the scientist to explain. A report of such a display at sea occurred on the 31st of October last in latitude 41° 42', longitude 54° 42'. We condense the description as given by the captain. The occurrence took place on the ship *Swedish Edward*, on her passage from Havre to New York:

Just before dawn the entire crew was at work bracing the mainyard. The ship was scudding along close reefed before a strong gale when the phenomena occurred.

It blew great guns and we were compelled to scud before it under bare poles. The seas were heavy and knocked my little ship about as though it had been a jollyboat. The gale had continued for several days, when, on the morning of the 31st, the sky grew darker as morning advanced, and the lightning and thunder drew nearer. About half past three A. M. it was directly over our ship. I had just ordered the men to brace the mainyard, when their work was suddenly interrupted by a loud crash of thunder, followed by an explosion like that of a thousand cannon. The lightning struck the main rigging directly over the men, and at the same moment a ball of fire just like a shell hopped about the rigging and then exploded. It was something sublime, although terrifying.

When the ball of fire exploded, streaks of lurid flame darted in every direction. It was just like the falling of a multitude of stars. For miles around the sea was illuminated, and every cord in our rigging shone like a strand of silver. The brilliancy was but momentary, however, and we were left in darkness to contemplate our thrilling position.

In less than five minutes another terrible flash of lightning, followed by another explosion and another ball of fire, augmented our terror, and sent me scurrying in every direction for shelter. We were all thoroughly frightened. The crew could not do any work. But our fears and astonishment were destined to be still further increased. Just as we were getting on our feet again, and thanking God that we had escaped with our lives, there was another thrilling display.

Suddenly and with a terrible sound a flash of lightning broke right above the main rigging, and out of it we could see another ball of fire playing above the rigging from the starboard side right over to the port. It, too, exploded, but with a noise and scattering of flaming fragments which sent the previous ones into comparative insignificance. I was dazed, and when I recovered eight and sense, not one of my men were on their feet. Some were tumbling about on the top of each other, some crying with fear and others stretched on their backs as though they had been struck dead.

One by one they got over the shock and fright. The second mate could not speak for several hours, and the whole work of keeping the vessel before the wind devolved on me and the first officer, who fortunately were not right under where the balls of fire exploded. The shock to the ship was terrific, and the timbers cracked each time we were struck.

As soon as the crew were able to get around I made a thorough examination of the vessel and rigging. It was not injured in the least and showed no signs whatever of the awful fuelade. The crew were all right in a day or so, but the second officer, who was among those stunned, complained for several days of a severe pain in the stomach, but now he is as hale and hearty as ever.

I have been in many storms during my long career on the sea, but never before had such an experience. We frequently meet these electrical displays, but I have never heard of one of the intensity of this. My vessel was loaded with iron ore, and this may have acted as a magnet to attract the meteor, or whatever you may call them.

[Bolt lightning, as it is called, is a rare manifestation of electrical phenomena. Until recently there were but a few authentic instances of its occurrence, and no very satisfactory explanation has ever been made of this very curious electrical display. Bolt lightning generally follows a stroke of ordinary forked lightning. It seems to come directly out of it in the form of a ball or bomb and makes its way, independent of any conductor, to the earth, often rebounding several times, as an ordinary ball would before coming to rest. The ball usually disappears with an explosion, as in the case above narrated, although it sometimes disappears quietly as though it were a glow of phosphorescent light. When such a phenomenon appears the lightning stroke seems to have been, from some cause, suddenly arrested in its course and its final energy exerted in the slower and more noticeable manner of ball lightning.]

Some interesting observations in regard to lightning have recently been made by Prof. Colladon of Geneva. His observations go to show that when lightning strikes a tree, for instance, it is first attracted by the numerous tiny top branches and by them conveyed to the limbs and from thence to the main body, where by concentration and greater resistance it makes its course manifest by hurrying the bark or the tree itself. It is possible that such obstructions may sometimes convert the swift-moving forked lightning into the

slower form of ball lightning. In the case of the ship as above, the tall topmast, the yards, ropes etc., were the prime conductors which led to the change to ball lightning, before the "fluid" reached the deck.—EDS. PRESS.]

A NEVER FAILING SUBSTITUTE FOR STEAM WHEN COAL GIVES OUT.—Discussing this subject, *Modern Light and Heat* closes as follows: A moment's reflection as to why we use coal as a source of energy will tell us what we can substitute for it when it is all gone. Roughly speaking, either a lump of hard coal weighing two and a half pounds, or 453 gallons of water which can be made to fall ten feet, will produce commercially a horse-power hour of work. The obvious reason why we prefer the lump of coal to the tank of water is this, that we find it already made for us; it will keep indefinitely and will not leak out through cracks; and lastly, we can bring it cheaply to the spot where we want the work done, and there burn it in a suitable boiler and obtain the horse-power hour of work. We hear people say that coal contains merely the stored energy of the sun. To be sure, but so also the water which is raised to a height above the sea in the form of rain, contains the stored energy of the sun, and if it is allowed to simply run down to the sea in rivers, the energy is made to do no useful work. It is a consoling fact that at the present time there is more energy going to waste in the form of fresh water lifted by the sun's rays and in the form of salt water lifted in tides by the moon's influence than is developed by the entire yearly consumption of coal, and it is a still more consoling fact that this source of energy is no further beyond our grasp than was the energy of coal a hundred years ago. It has already been demonstrated that through the agency of electricity we can at any chosen place use the energy of the winds and tides and running waters in a way that is almost equivalent to burning coal without digging it from its native bed.

THE TRAMP ACROSS GREENLAND by Dr. Nansen and his accompanying party of scientists, to which allusion has already been made in these columns, did not result in any discovery of scientific import. The party had expected to have made a landing high up on the eastern shore, but were unable to do so, and the vessel in which they took passage was forced to land them at a point so near the southern shore that they saw but little of "Greenland's Ice Mountains" beyond what any navigator might see by a voyage around its southern extremity. Still the sufferings of the party were so intense that in all probability no other party will ever undertake to cross that continent at any more northerly point. They traveled about 350 miles, but were not at any time over 100 miles from the ocean, yet they crossed a mountain range at an elevation of 9000 feet above the sea, with icy peaks at least 100 feet higher in sight. They endured great hardships and braved many mountain perils. He who explores Greenland to any purpose must land several hundred miles above the point where Dr. Nansen disembarked, and make his way through the heart of that Arctic continent. But what aid to either science or commerce would he gained by such a foolhardy trip across such an ice-covered region is more than the ordinary mind can imagine. There might be some gain to science if a nearer approach could be made to the North Pole in settling the question of a supposed open polar sea, for the existence of which there are very many indications, and for a determination in the aid of commerce and navigation of the mystery of circumpolar ocean currents.

A NEW OIL LIGHT.—A new oil light was shown in public near London recently. It is stated that the principal feature of this new light is the mode of evaporizing the oil and preventing its escape in the form of spray, or, in short, the method of obtaining complete combustion. Creosote oil is ordinarily used, and, after a small quantity of spirit has been poured on the surface of the oil contained in the well of the lamp, a light is applied and the radiating covers put on. Compressed air is then turned on, which, passing by means of a small jet through the center of the flame and over the surface of the oil in the well, forms a high temperature and also produces an induced current, which raises the gas of the heated oil and at the same time draws in the necessary supply of air to complete perfect combustion and produce a powerful light. The well of the lamp is connected with a tank or reservoir, insuring a constant supply of oil. The flame forced up from the lamp emits no smoke, and the light, though naked, does not dazzle the eyes. The light is chiefly intended for industrial work on a large scale, such as in connection with railways, docks and buildings, where the illumination of large spaces in the open air or under cover is required. Either common creosote oil, crude petroleum, or any other heavy hydrocarbons may be used.

A NATURAL WELL OF REFINED OIL.—It is stated that on the Summerville farm, three miles north of Brady's Bend, Penn., an oil-well is located which every day pumps about a barrel of first-class refined petroleum. The residents of that vicinity purchase this illuminant and burn it in their lamps without its having gone through any process. It answers the purpose equally as well as the finest illuminating kerosene, does not smoke nor has it an unpleasant odor.

USEFUL INFORMATION.

LOOSE TIRES AND SPOKES.—A correspondent of the Germantown, Pa., *Telegraph* writes to that paper as follows: "In a recent issue of the *Telegraph* there is an item in regard to oiling wheels with hot linseed oil when tire and spokes are loose, instead of having the tires reset. I have practiced this method for the last nine years, and have found that the wheels keep in much better condition than when I went to the blacksmith and had the tire reset. I have a one-horse farm and lumber wagon, and the tires had become so loose that it was difficult to keep them on the fellows, but not knowing the use of oil I had them reset. Two years after I saw the statement made in regard to oiling them and tried it, and from that time to the present the tires are as tight as a nut, and the fellows as hard and sound as a nut. By repeating the oiling once in two years they will remain so until they are entirely worn off. For resetting it cost me \$2, for the oil it cost me about 15 cents. A better illustration of the advantage of oiling wheels instead of resetting tire was in the case of my wheelbarrow, the wheel of which had become so dry and shrunken that the tire would fall from the fellow; but by giving it three good oilings the tire has become so tight and firm, and has been so for the last five years, that it could not be driven off with a hammer. I have recommended this course to a number of my neighbors, and they have found by practical experience that oiling the fellows, spokes and hubs of their wheels is preferable to taking them to the blacksmith-shop to have the tire reset, while the expense is a mere trifle. Try it and see if it is not so."

BURSTING OF THE HAINSWORTH CAST-STEEL GUN.—It seems that the steel gun about which so much has been published during the past year has served only to illustrate the pluck and energy of a Pittsburg firm that persisted in an experiment which from the start was said to have had small chances of success. This gun, under the direction of Supt. Hainsworth, was recently tested at Annapolis. Quite a number of naval officers and a party of visitors from Pittsburg were present, when a preliminary charge of 36 pounds of powder and a projectile weighing 10 pounds were put in the gun. This was fired without the least effect upon the piece. The charge of powder was then increased to 50 pounds, but when the smoke of the second shot had cleared away, pieces of the gun were found in various directions, while the structure that had been raised around it, and the building covering all, were almost totally wrecked. It cannot yet be determined whether the test was positive proof that cast-steel guns must be a failure, and that only steel guns constructed on the built-up process can be made a success, although it is admitted that no flaw could be found in the fragments. The gun was an experiment, and if it can be made successful will greatly reduce the heavy cost now entailed in the construction of steel guns of large caliber. No announcement has yet been made whether or not the experiment will be repeated.

HOW TO MAKE GROUND GLASS.—A correspondent of the *Scientific American* gives the following process by which he has made ground glass: "I first bought five cents' worth of emery and two plates of glass the size required. Spoiled negatives will do if they are cleaned, which can be done with a strong solution of lye. I placed one of the glasses on a flat board and sprinkled a small quantity of emery on it, which I wet with water. Placing the other glass on that, I ground them together, renewing the emery and water whenever necessary. In about one hour I had two of the finest quality of ground glass, fully as good as those I would have to pay 75 cents for (8x10 inches)."

PUMP DISCHARGES.—When the suction pipe of a pump is long or has bends in it, or if the water has to pass through valves on its way to the pump, its diameter should be larger than the water-chamber inlet, and be contracted at its connection to the diameter of that inlet. The diameter of suction pipe, in each case, for an inch inlet should be $1\frac{1}{2}$ inches; that for a two-inch inlet $2\frac{1}{2}$ inches, and that for a three-inch inlet should be $3\frac{1}{2}$ inches, and so on, in about like proportion, diminishing the ratio somewhat as the size of the inlet increases.—*Safety Valve.*

FRESNO is to have a 'possum farm. Jesse Irwin, a prominent citizen of that place, has just returned from Pike county, Mo., with a carload of these animals. The ranch is to be fenced with an old-fashioned rail fence, covered with guard wire, and each recess of the fence is to be supplied with a hollow log. He is going to plant 20 acres of persimmons and the same number of acres of black haws, and his sweet-potato patch will be the largest in Fresno county.

The zinc mines of the Pern Zinc Company, located at Galena, which were the most extensive in the United States, and which have been closed for nearly three years, will be reopened soon and a large force of men put to work.

A **USEFUL INVENTION** is just now being introduced into this country from Germany, whence we derive no inconsiderable number of novelties. It consists of a metal

joint to be used at each corner of an ordinary card-board box for the purpose of securing the adjacent sides in a stronger and better manner than by the employment of paper and paste. The sides of the box are also turned inward instead of outward, after the groove or joint is made, and this also tends to strengthen the joint. It is claimed that a much stronger and more durable box at a slight reduction in cost is the result of this process, as compared with those made in the usual way.

RAILWAY ROLLING STOCK FOR SOUTH AMERICA.—Heavy Argentine contracts are reported as having recently been made by Senor Miguel M. Tadin of Buenos Ayres for locomotives, passenger and other cars intended for the Government railways of the Argentine Republic. A contract for 50 locomotives is mentioned, but is not yet exactly located as far as the lucky builders are concerned.

A SELF-REGISTERING CONTRIBUTION-BOX.—An Englishman has invented a contribution-box that registers the amount deposited. Nothing less than five cents goes, and a charming chime of bells are agitated with emotion when a dollar drops into the slot.

WHAT IS A "MASCOT"?—The term is a French provincialism meaning one's lucky wight or charm for good fortune. The term in French is "la mascotte," and is of the feminine gender. "Le mascot" is the masculine form, but the feminine is always used.

TO HARDEN PLASTER OF PARIS.—To harden plaster of paris, add five or ten per cent of hydraulic cement to the plaster before wetting. Five per cent of finely ground sulphate of potassium will give even a quieter degree of hardness.

AMERICAN LARD.—In addition to the enormous quantity of American lard which enters into home consumption, more than \$40,000,000 worth is exported every year. Lard ranks sixth in value out of \$800,000,000 of American exports.

THE LARGEST ELECTRIC PLANT in the world will soon be put in operation. London is to be illuminated by electricity, and a contract for the immense undertaking has already been made.

OSTRICH FEATHERS.—It is said that the demand for ostrich feathers has recently largely fallen off. This will not be good news for our California ostrich farmers.

GOOD HEALTH.

The Dread of Death.

Sir Lyon Playfair has written to Junius Henri Brown the following letter in regard to the latter's paper in the *Forum* on the "Dread of Death":

Dear Sir:—I have read your article on death with much interest. This subject has often occupied my mind, and I have been led to the same conclusions. Having represented a large medical constituency (the University of Edinburgh) for seventeen years as a member of Parliament, I naturally came in contact with the most eminent medical men of England. I have put the question to most of them, "Did you, in your extensive practice, ever know a patient who was afraid to die?" With two exceptions they answered "No." One of these exceptions was Sir Benjamin Brodie, who said he had seen one case, that of a young girl of bad character who had a sudden accident.

I have known three friends who were partially devoured by wild beasts under apparently hopeless circumstances of escape. The first was Livingstone, the great African traveler, who was knocked on his back by a lion, which began to munch his arm. He assured me that he felt no fear or pain, and that his only feeling was one of intense curiosity as to which part of his body the lion would take next. The next was Rastem Pasha, now Turkish Ambassador in London. A bear attacked him, and tore off part of his hand and part of his arm and shoulder. He also assured me that he had neither a sense of pain nor of fear, but that he felt excessively angry because the bear grunted with so much satisfaction in munching him. The third case is that of Sir Edward Bradford, an Indian officer now occupying a high position in the Indian office. He was seized in a solitary place by a tiger, which held him firmly behind his shoulders with one paw, and then deliberately devoured the whole of his arm, beginning at the end and ending at the shoulder. He was positive that he had no sensation of fear and thinks that he felt a little pain when the fangs went through his hand, but is certain that he felt none during the munching of his arm.

I was led to the same conclusions as yourself when I attended the hospital as a medical student, and I thought you might like some confirmation of the views described in your interesting article in the *Forum*.

THE USE OF WATER ON THE SCALP.—"People become bald from washing the head," said an English barber. "The use of water on the scalp may make a man feel buoyant for a time, but you will notice that the hair becomes dry and brittle afterward. The water and subse-

quent rubbing with a towel dry up the oil in the roots, and in time the hair becomes dead and drops out. In England people never think of washing the hair. A good comb and stiff brush are all that are needed to keep the head clean. The women often spend hours in combing out their hair, and that is the most laborious part of a maid's work. Instead of shampooing, English barbers use a machine shaped like a little harrel and covered with stiff bristles. This is run by a small gas engine, and will winnow every speck of dirt out of a man's head in a few minutes. I have heard there are some in use in this city, but I have never seen one." Another important agent in causing baldness is the indiscriminate use of fancy toilet soaps. If you wash your head, use only good castile soap, and you will be surprised to find, if your hair has been falling out, how soon the loss will cease.

ACCIDENTS IN MILLS AND SHOPS.—A large number of accidents are constantly occurring in mills, machine-shops, etc., to employes, but mostly from carelessness on their part. Occasionally, perhaps, it is the fault of those in charge in not providing proper means to prevent these accidents. In most cases a lawsuit is the outcome from these accidents. The injured person naturally seeks to obtain damage for his sufferings, and in many cases, as is well known, with success, for juries, as a general thing, naturally sympathize with the injured party, and a verdict is accordingly recorded against the corporation. So often do cases of this kind occur that a company has been organized in Boston to insure employers against damages from this source. The cost of insurance is very small, as statistics show there is no more danger that an accident may occur to one of the employes upon which damages would have to be paid than that the building will take fire and burn down; therefore, a protection against these should be as desirable as one against fire.

MUSIC IN MEDICINE.—From the time when medical knowledge was first embodied in rules of practice, and probably from a much earlier period, music has held a recognized place in the treatment of disease. In no class of diseases, however, are we likely to derive so much benefit from the use of so pleasant a remedy as in those affecting the mind itself. In melancholia and allied states of depression its value is generally admitted in our own day. Ancient practitioners were also cognizant of its usefulness in this respect. We must all have felt how suitable is its infinite variety and facility of expression to the changing moods of the sane, and it is therefore the less difficult to understand how straying minds are pleased and settled by its charm. Certain it is that its beneficial effect is in this case considerable, and our readers, though possibly unable to acquire a knowledge of the art, should at least possess, and if needful assert in practice, a sense of its therapeutic value.—*London Lancet.*

SMOKERS' VERTIGO.—Dr. Dacaiene is reported in the *New York Medical Record* as having recently investigated a number of cases of vertigo in smokers. Out of 63 patients 49 were between 50 and 66 years of age. More than half of them suffered, in addition, from digestive troubles, with constipation, alternating with diarrhea, insomnia, palpitations, dyspnea and diuresis. In the third of the number there was marked intermittence of the pulse and granular pharyngitis, while others suffered from aphthae, amblyopia, etc. Thirty-seven were persons who smoked habitually on an empty stomach, and these suffered from vertigo, principally in the morning. The vertigo generally coincided with suppression of perspiration and diminished excretion of urine. The treatment consisted mainly in regulating or suppressing the cause, but 33 out of 37 patients ceased to suffer on merely refraining from smoking on an empty stomach.

TOUGH FRUIT SKINS.—The skin of plums is wonderfully strong compared with its thickness, and resists the action of water and many solvents in a remarkable manner. If not thoroughly masticated before taking into the stomach, this skin is rarely, if ever, dissolved by the gastric juice. In some cases pieces of it adhere to the coats of the stomach as wet paper clings to bodies, causing more or less disturbance or inconvenience. Rinses and dried currants are particularly troublesome in this way, and if not chopped up before cooking, should be thoroughly chewed before swallowing. If a dried currant passes into the stomach whole, it is never digested at all.—*Popular Science Monthly.*

A DISINFECTANT FOR THE SICKROOM.—A new disinfectant compound for purifying the atmosphere of the sickroom has just been presented to the Berlin Medical Society. Oils of rosemary, lavender and thyme, in the proportion of 10, 2, and $2\frac{1}{2}$ parts respectively, are mixed with nitric acid in the proportion of 30 to 1. The bottle should be shaken before using, and a sponge saturated with the compound left to diffuse by evaporation.

SMALLPOX IN MERCED.—Five cases of smallpox were reported in Merced December 15th. The dwellings where the cases exist are quarantined and marked by yellow flags. So far the disease is of a mild form, and the utmost care is taken to prevent its spread. Vaccination is general. The doctors are all busy vaccinating at the expense of the county.

California in London.

The meeting in this city on Tuesday of this week in the support of an enterprise proposed by Mr. Lubin of Sacramento for a permanent exposition of California products in London, was well attended and interesting. Among those present were the following:

Delegates-at-large—George C. Perkins, Adam Grant, P. B. Cornwall, Louis Sloss, H. M. Larue, Prof. E. W. Hilgard, T. H. Goodman, Albert Gallatin.
Alameda county—J. S. Emery, C. M. Plum, M. J. Keller.
Butte—E. T. Reynolds.
Colusa—Dr. A. Gray, J. B. de Jarnett.
Contra Costa—E. B. Smith, David Lush.
El Dorado—L. G. Harvey.
Fresno—A. B. Butler.
Kern—R. E. Houghton.
Los Angeles—W. H. Workman, H. Lindley, Dr. Burbank, J. B. Lankershim.
Lassen—C. G. Hutchinson, W. F. Perry.
Lake—Carrie Stevens Walters.
Marin—F. C. de Long.
Monterey—Jesse D. Carr, G. W. Nance.
Napa—M. M. Estee, Leonard Coates.
Placer—A. P. Hall, P. W. Butler.
Sacramento—Dr. G. L. Simms, E. L. Gregory, D. Lubin, W. R. Strong, G. W. Harcock.
San Benito—Dr. Thomas Flint.
San Diego—Alexander Gordon, Timothy Hopkins.
San Mateo—C. B. Turfill, I. M. Merrill, Frank A. Kimball.
San Bernardino—O. T. Dyer, D. L. Wilher, F. A. Miller, Matthew Gale.
San Joaquin—L. U. Shippeo, S. A. Woods, J. A. Merriam.
San Francisco—G. K. Fitch, W. H. Mills, Frank Dalton, A. T. Dewey, General Harby, John P. Irish, Santa Clara—T. Beach, W. C. Andrews, N. Cadwalader.
Sonoma—H. W. Byington, John Adams.
Solano—G. P. Plaister, G. N. Platt.
Stanislaus—J. B. Caldwell, E. B. Beard.
Tehama—N. P. Chipman, J. S. Cone.
Trinity—T. J. Timlin.
Ventura—Geo. A. Newhall.
Yuba and Sutter—J. B. Montague, John Hall.
Yolo—R. B. Blowers, Wm. Suddon, C. W. Reed.

The meeting was organized by the advice of A. T. Hatch as temporary chairman, with J. Meredith Davies and C. B. Turfill temporary secretaries.

The following committees were then appointed by Chairman Hatch: Permanent Organization—Mr. Workman, C. B. Turfill, P. B. Cornwall, H. M. Low, and H. W. Byington; Order of Business—W. H. Mills, Mr. Wilbur, Harvey Lindley, M. M. Estee and Jesse D. Carr.

The committees retired, and in their absence David Lubin and Mr. Taber of Sacramento addressed the meeting in support of the general proposition of a California exhibit in London.

Mr. Estes then presented a resolution that a permanent exhibit of Californian products be established in London. The resolution was unanimously adopted.

The Committee on Order of Business presented the following report, which was adopted:

First—Consideration of general subject, and answer to the question, Shall an exhibition of the products of California be held in London?
Second—The duration of such exhibition.
Third—The general plan.
Fourth—Consideration and ascertainment of cost.
Fifth—Consideration of ways and means.
Sixth—Appointment of committees.

The Committee on Permanent Organization presented their report as follows: For Permanent Chairman, W. H. Mills of San Francisco; Permanent Secretary, J. M. Davies of Alameda; Vice-Presidents—A. B. Butler of Fresno, E. W. Jones of Los Angeles, and David Lubin of Sacramento; Treasurer, Louis Sloss. Also one vice-president for each county, and an Executive Committee of 15 members to be elected by the convention. The reports were adopted.

A. Daw-Kerrell, Surveyor Tinnin and Chas. B. Turfill of San Diego then addressed the meeting, after which the usual noon recess was taken.

At the afternoon session the first speaker was Prof. Hilgard of the State University. The professor approved of the project of the exhibition, and promised to do all in his power for its furtherance. N. Cadwalader and J. P. Irish also supported the proposition.

William L. Merry was also in favor of the proposed exhibition, saying that London was the center of the mercantile world.

Mr. Estee then presented the following:

WHEREAS, It is deemed desirable to make an exhibition illustrative of California in London; and whereas all portions of this State are equally interested in the success of such an exhibition; therefore be it

Resolved, That the Legislature be requested to appropriate the sum of \$-000, to be expended under direction of a commission appointed by the Governor maintaining an exhibition for two years in London.

Mayor Workman of Los Angeles moved that the blank in Mr. Estee's resolution be filled by the insertion of "\$250,000," and after some discussion the resolution as thus amended was unanimously adopted.

The following gentlemen were then elected members of the Executive Committee: P. B. Cornwall and William H. Mills of San Francisco; C. W. Playter of Alameda; J. B. de Jarnett of Colusa; T. E. Hughes of Fresno; Mayor Workman and J. B. Lankershim of Los Angeles; A. P. Hall of Placer, H. M. Larue and David Lubin of Sacramento; A. S. White of San Bernardino; Charles B. Turfill of San Diego; L. U. Shippeo of Stockton; N. Cadwalader of Santa Clara; H. W. Byington of Sonoma; N. P. Chipman of Tehama; and R. B. Bowers of Yolo. To this committee were afterward added A. T. Hatch of Solano, Captain Merry of San Francisco, Prof. Hilgard of Alameda and M. M. Estee of Napa.

The meeting then adjourned, subject to the call of the Executive Committee.



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SAN FRANCISCO

Saturday Morning, Dec. 29, 1888.

TABLE OF CONTENTS.

ILLUSTRATIONS.—Morgan's Ventilating Manhole; Machine for Making Spirally-Welded Tubing, 425.

EDITORIALS.—Spirally-Welded Tubing; Ventilating Manhole for Sewers, 425. Passing Events; Close of the Volume; Eclipse Observing Parties; Special Phenomena During the Eclipse, 432. A Mining Stock Association; Incline Railways, 433. Photographs of the Eclipse, 436.

CORRESPONDENCE.—Lixivation of Silver Ores with Hypoculphuric Solution; Neglected Sources of Power in the Mines, 426.

MISCELLANEOUS.—Mining Company Meeting, in London, 431.

MECHANICAL PROGRESS.—Rope Transmission; The Steel Sleeper Business; What an American Manufacturer is Doing in China; Heating Rolling Mill Rolls; A New Building Cement; Spontaneous Combustion; A New Wooden Pulley; Our Steel Rail Industry; Steel as Cheap as Iron, 430.

SCIENTIFIC PROGRESS.—Terrible Electric Storm at Sea; A Never Failing Substitute for Steam when Coal Gives Out; The Tramp Across Greenland; A New Oil Light; A Natural Well of Refined Oil, 430.

USEFUL INFORMATION.—Loose Tires and Spokes; Bursting of the Hainsworth Cast-Steel Gun; Pump Discharges; Railway Rolling Stock for South America; A Self-Registering Contribution Box; What is a "Masoot"; To Harden Plaster of Paris; American Lard; The Largest Electric Plant, 431.

GOOD HEALTH.—The Dread of Death; The Use of Water on the Scalp; Accidents in Mills and Shops; Music in Medicine; Smoker's Vertigo; Tough Fruit Skins; A Disinfectant for the Sickroom; Smallpox in Mexico, 431.

MINING SUMMARY.—From the various counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 428-29.

MINING STOCK MARKET.—Sales at the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, and Bullion Shipments, 440.

Business Announcements.

[NEW THIS WEEK.]

Sampling Works for Sale—Gillespie & Childs.
Dividend Notice—German Savings & Loan Society.

See Advertising Columns.

Passing Events.

The last week of the year brings also the end of Volume LVI of the MINING AND SCIENTIFIC PRESS. This is also the best time for the renewal of subscriptions. We hope this gentle hint will be responded to promptly by those who have thus far neglected to send in their orders.

Under the U. S. mining laws, this is the last week for miners to do assessment work on their claims for the year. Doubtless, on the 1st of January, many neglected claims will be relocated, and the new owners will, in most instances, do more or less work on them to see what they are worth.

The eclipse of the sun, which occurs next Tuesday, is a very important astronomical event, and during this week final preparations have been made by many parties who intend observing it. Some of the parties are already on the field arranging their instruments, etc.

The rain has fallen very steadily all over the State for the past week, so there is now an abundance of water for mining operations. The snowfall in the mountains has not, however, been very heavy thus far.

The formation of an association to protect mining-stock owners, alluded to in another column, is an important move, and one calculated to be of great benefit if the work is carried on as at present intended.

Close of the Volume.

This number is the last one of Volume LVI of the MINING AND SCIENTIFIC PRESS. The index on the last page gives an idea to the casual reader, who is not familiar with the paper, of the scope of the contents, embracing, as it does, most branches of popular science, mining, metallurgy, mechanics, engineering, inventions, etc. Of late we have largely increased the number of engravings and intend to develop this feature still more fully. The market reports have been extended so as to meet the wants of the industrial classes, and this department will be added to as occasion demands. Our list of correspondents has increased of late, as our constant readers have, no doubt, noticed. It is the intention of the publishers and editors to still further improve the paper in several particulars. The MINING AND SCIENTIFIC PRESS is now the oldest mining paper published in the United States. It has been through all the "excitements" and depressions incident to mining in this country, and in so doing its publishers have gained an experience that is valuable to the reader.

It has always been, and will continue to be, our policy to gather available information concerning all new processes and appliances connected with mining and metallurgy and give detailed descriptions thereof. This feature alone should make the PRESS indispensable to all who are engaged in the mining industry, as it keeps them posted and abreast of the times.

Of course the more readers we have the better can be our influence and our work. We trust that those who have been readers for years will call the attention of others to the advantages of subscribing for the PRESS. It is our aim to publish a paper which shall contain from week to week more or less on many subjects which will be of interest and benefit to the progressive industrial classes of this coast. In this we need the aid of these classes themselves for mutual benefit.

Eclipse-Observing Parties.

As excursion trains are to be run from this city on Tuesday next to various points on the line of totality of the eclipse of the sun, large numbers of persons will be able to witness the phenomenon and will take advantage of the opportunity. In this city the eclipse will not be total, although about eleven-twelfths of the sun will be obscured. Aside from the small parties, and individuals, who will go to places within the lines of totality, there are several parties who go to make exact scientific observations, and who are supplied with all the necessary instruments and appliances.

The party from the Lick Observatory consists of Messrs. Keeler, Barnard, Hill, and a University student. They will have the portable six-inch Clark telescope from the Lick Observatory and the spectroscope belonging to the Chabot Observatory, Oakland. They are to photograph and examine the corona particularly. Mr. Keeler will use the spectroscope, and Mr. Barnard will attend to the photography. Mr. Hill will assist Mr. Keeler, and the student will make photo-metric measures of the light of the corona. This party will observe at Bartlett Springs, and some of them have been there for a week past making preliminary arrangements. Observations will also be made at the Lick Observatory by Prof. Holden and Mr. Burnham. The observatory will be closed to the public on the day of the eclipse.

Of the Harvard Observatory party, who will be stationed at Willows, Colusa county, several of the members have been on the ground for a month past. Mr. Bailey has made the preliminary arrangements. It is probable that Prof. Pickering will be in charge. They have, among other instruments, a 13-inch photographic telescope, and will photograph the corona and the spectrum of the corona. There are five members of this eclipse expedition.

Probably the largest party in the field will be that of the Pacific Coast Amateur Photographic Association. At a meeting of the association it was voted to give Mr. Chas. Burckhalter, an honorary member, and assistant in charge of the Chabot Observatory, Oakland, all the assistance possible, and for the members of the association to accompany him in a body to the point selected near Cloverdale, for the purpose of making photographic observations under his directions. There are about 40 in this party, 25 of

whom have first-class photographic cameras and appliances. This will be the largest body of photographers ever brought together for scientific observations of this character. All of them are skillful in outdoor work and have been preparing for this for some time. Mr. W. H. Lowden, an accomplished amateur, will take a very large camera with a 3-inch lens and 22-inch focus, with special apparatus for following the corona during the time of exposure. The camera is arranged carefully on an equatorial mounting. Mr. Burckhalter will take with him a 10½-inch reflecting telescope made by Brashear. This Newtonian reflector he has converted into a photographic camera; special apparatus have been constructed to obtain a large field. The main observations will be photographic drawings of corona, meteorological changes during eclipse, etc.

In this party are several lady artists who will draw the corona in colors. There will be several telescopes, barometer, thermometer, hygrometer, anemometer, etc., so that exact observations can be made. All the work will be done under the direction of Mr. Burckhalter. He, with four others, leave here Saturday to establish the latitude and longitude of the stations and make preliminary arrangements. The rest of the party will leave the city on Monday, and will practice for their work on Tuesday morning. It is probable that the point selected will be a hill about a mile and a half from Cloverdale. Representatives of the MINING AND SCIENTIFIC PRESS are attached to this party and will assist with the instruments in making the observations.

Prof. George Davidson is absent at Los Angeles measuring the base-line, and will be unable to observe the eclipse, as he had expected. His son, Thomas Davidson, will, however, be in charge of a small party of observers at Winnemucca mountain, Nev.

F. G. Blinn of East Oakland will take his five-inch Clark refractor telescope to Winnemucca mountain.

Prof. Prichett will be in charge of the party from Washington Observatory, at Willows, Colusa county. They have a Clark four-inch refractor telescope and will make a special study of the corona and observe contacts. Prof. Nipher will have charge of the photographic instruments. They have a large camera, an equatorial mounting, the same one used by Prof. Prichett in 1882, when observing the transit of Venus in New Zealand. Mr. Engle of this party will make pencil sketches of the corona.

It is stated that a corps of observers from Amherst College Observatory, in charge of Prof. David P. Todd, will be stationed near Winnemucca mountain, Nevada.

J. A. Brashear of Alleghany, Pa., the famous optician who made the great spectroscope for the Lick Observatory, has telegraphed a friend here that he will make observations of the eclipse at Winnemucca, and afterward make his first visit to San Francisco.

A party of five of the class of '88, University of California, intend going to Yankee Hill, Butte Co., not far from Oroville. They will take two two-inch telescopes and a camera. This party consists of W. E. Downs, R. Drew, O. B. Ellsworth, T. Palmer and C. W. Hilleglass.

Two students of the class of '89, University of California—Messrs. Carson and Bakewell, will observe near Cloverdale.

James P. Jones of Oakland is organizing a party to go to Mt. St. Helena, Napa Co., and will take suitable instruments for exact observations.

Alexander Badlam with a party of 20 will visit one of the high peaks in Lake county with apparatus for photographic and other observations.

U. S. Surveyor-General C. W. Irish of Nevada will observe at Liegar Station, Nevada & Oregon R. R., in Nevada. This gentleman observed and photographed a previous eclipse, and has made extensive observations for this one.

THE Idaho gold mine of Grass Valley, Nevada county, this State, has produced altogether \$10,400,000. The yield for the past 11 months is about \$600,000. The month of January, 1888, very little was produced, owing to the water ditch being blocked by ice. The width of the pay chute has doubled in the past year near the Maryland mine adjoining.

Special Phenomena During the Eclipse.

A great many people will go from this city to some point on the line of totality of the eclipse on Tuesday, who scarcely know what there is to see aside from the mere temporary observing of the sun. In last week's PRESS were given the main facts of interest concerning the coming eclipse—suggestions for observers, by Prof. Holden, director of the Lick Observatory. But there are also special phenomena to which Prof. Holden calls the attention of those who intend observing closely. Those specially interested should look out for the following mentioned phenomena:

Near Beginning and End of Eclipse.

(1) Visibility of the limb of the moon before it touches and after it leaves the sun, and the time and distance at which it is noticed.

(2) Apparent agitation of the sun's limb near the point of contact immediately before and after the eclipse.

(3) Whether the contacts are instantaneous and well defined, or whether there are apparent adhesions and distortions, formation of heads, or portions of the moon's limb separated by dark lines or other irregularities of outline.

During Progress of Eclipse.

(4) Projection of the moon beyond the sun; time and extent to be noted.

(5) Irregularities of the moon's limb. Distortions of the solar cusps, their color and shading.

(6) Bright band bordering the moon's edge; color of the glass screen through which the moon is best seen.

(7) Flashes or coruscations of light across the moon.

(8) Any peculiarities of the illumination and color of the moon's disc or any portion of it; spots which may be visible.

(9) Any peculiarity in the appearance and color of the solar spots, especially near the edge of the moon.

Near Instants of Total Immersion and Emergence.

(10) Rapid change of the last visible portion of the sun, or of that which first reappears; a separation into minute parts, or formation of Bailey's heads, with dark lines among them.

(11) Any increased brightness of the moon's edge, and when and where it is noticed.

(12) Flashes, rays, or bright points as the sun disappears or reappears.

(13) The approach and recession of the shadow, appearing on the ground like that of a cloud, should be watched by those who are not occupied with other observations; and any peculiarities described, as for instance, whether its appearance and motion are uniform, or if dark stripes appear flitting across the landscape; if these are seen, their distance apart, width, and velocity should be noted.

During the Total Phase.

(14) The general appearance and extent of the corona; when and where it first appears and disappears; whether uniformly surrounding the moon's disc, or brighter and more extensive on one side, especially where the sun has just disappeared, or is about reappearing; its color in different portions; its shading, and whether separated into two portions, one brighter and shaded uniformly, the other radially striated; its changes.

(15) Prominences or protuberances along the edge of the moon, with their position, form, extent, color, and any other peculiarity; also their formation, growth, and any other changes. The position and extent should be noted on a diagram previously prepared.

(16) Colors of the clouds or fog, and especially a note of the changes of color.

If there are several observers with telescopes, it is desirable that one should keep the whole corona in view, while each of the others confines his attention to some designated portion. Those without telescopes, or supplied with opera glasses or spy-glasses, should also note the appearance, extent, and peculiarities of the corona, as it appears to them.

(17) A comet may possibly be seen near the sun, or an aurora be visible.

THE Reno Gazette says: Senator Stewart telegraphs Charles Friend of Carson that a bond for \$3000 has been forwarded to that city, and as soon as it is returned with proper signatures, the new telescope for the Observatory will be shipped.

A Mining Stock Association:

Probably one of the most important movements of the present day is that of representative mining men, organizing to see that the Comstock mines listed on the stock exchanges are worked in the interest of all stockholders, and not for a limited few. The organization is called the Mining Stock Association, and for the present the head office is in room 10, old Odd Fellows' building, 325 Montgomery street. The association is composed of bona-fide mining-stock owners, who have become tired of expecting reform in the mining-director system of working mines on the Comstock.

The first move to abate this evil was made the past week, in bringing an action in the Su-

preme court to make daily visits, or as often as desired, in the mines and report on the same in their official capacity.

By this course the association expects it can prevent a development being concealed, unduly magnified or belittled, as is now done in the interest of the stock manipulators. The association has, at this writing, a membership of 135, with every day bringing in new members—persons of standing and character in the community. If they succeed in righting, and there can be no doubt but they can, the wrongs claimed to be so persistently carried on in the management of the mines, there can be no doubt but moneyed men will not fear to invest in mining shares, for the Comstock mines are rich in mineral ore, and if properly

Incline Railways.

One of the problems which mining engineers have occasionally to solve is that of the best method of bringing ores up or down inclines, where ordinary teaming is impossible. One of the successful incline railways of this country is that at Lookout Mountain, near Chattanooga, Tennessee. We gave some facts concerning the length and general plan of this road in the PRESS of December 1st from a description by Mr. Adams, and in this number present some engravings showing details, which will interest mining and civil engineers.

The rails are of steel, 25 pounds to the yard, and laid on cedar ties nine feet long. No spikes are used, the rails being secured by

driving cable is one inch in diameter, with the same number of wires. The sheave at the summit is held in place by a wooden frame anchored to masonry piers which rest upon and are bolted to the original rock. Fig. 4 shows a section and elevation of the engine-house and plant.

The engines, built by Wheeland of Chattanooga, have two cylinders, 12x18 inches, connected to the main shaft, and a 20-inch steel pinion and two 80-inch gear-wheels actuate the two 80-inch double and triple-grooved driving sheaves.

The lead of the cable passes around the driving sheaves, as shown in Fig. 1, and around a pair of smaller sheaves, fixed in a sliding frame to which is attached a counterpoise, serv-

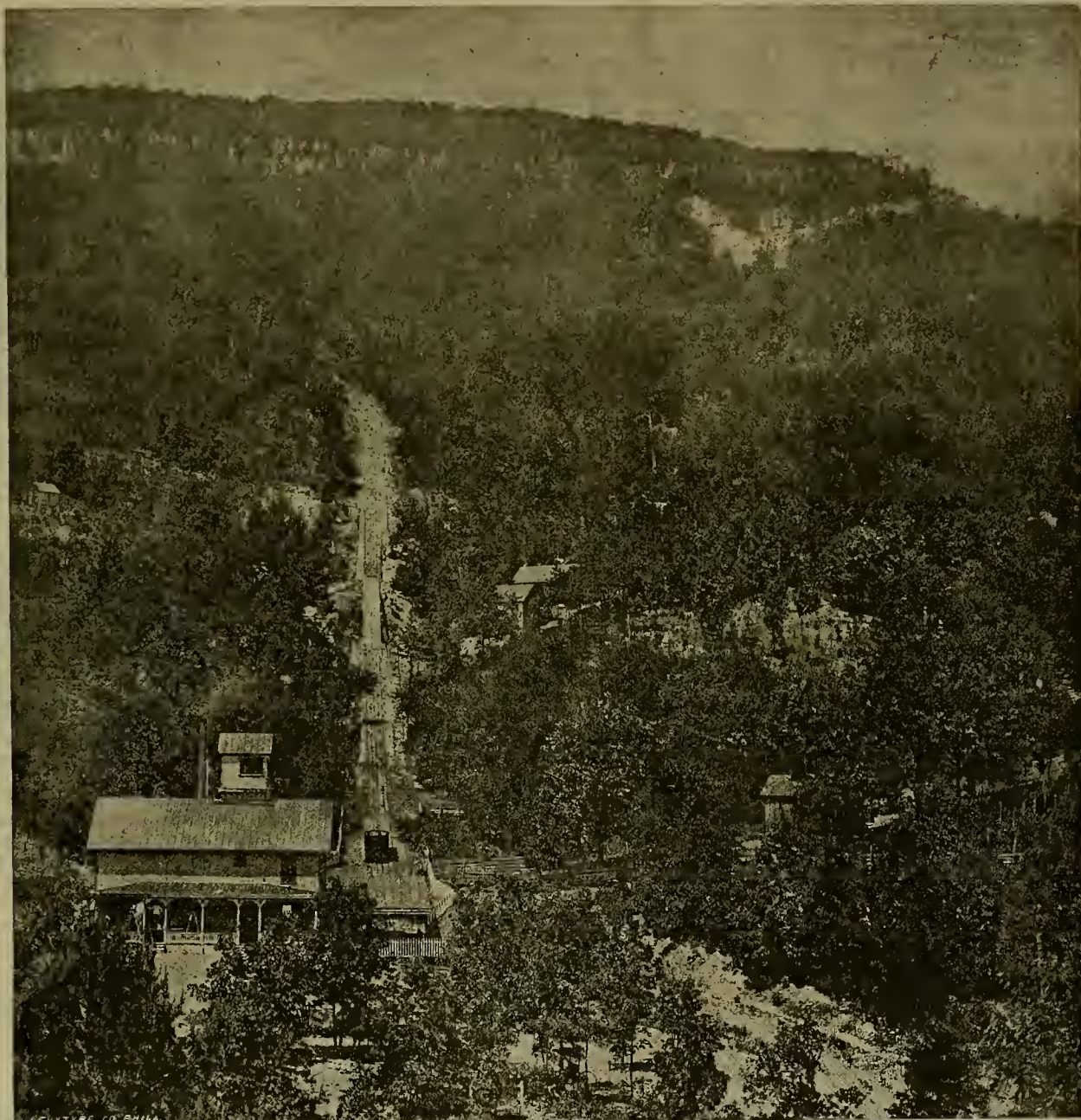


FIG. 1.—LOOKOUT MOUNTAIN RAILWAY, VIEW FROM LOWER TERMINAL.

perior Court of this city, to test the validity of the Mining Act, passed by the Legislature in April, 1880, to regulate the voting of stock by proxy. This law was enacted to reform the system of mines being controlled by dummy directors, who would sell or otherwise dispose of the ores in the mines to the mill rings for a mere trifle. It has so far proven a dead letter, for what is every person's business is no one's, but now in union the object can be accomplished. If the law is declared constitutional, then mine elections can only be carried by actual holders or owners of stock, and not as is now done—by brokers' proxies.

Another wrong the association proposes to right is to insist that the Comstock mines be worked to the best possible advantage, and also that the grading of ores so as to reduce their value, by which more milling can be secured to mill-owners, be done away with. The association intends to have their own experts, men of large experience and thorough reliability,

worked ought to pay large dividends for a long time to come.

SOME Chinamen near Coulterville, Mariposa county, have been taking out and shipping to China a peculiar quartz that is found there. The quartz is not vitreous in appearance, but looks like loaf-sugar. It is apparently barren of mineral, and the Chinese will not tell what it is to be used for. They have shipped altogether about 10 tons, and are taking out more.

ALUM.—The Salt Lake Herald says: An alum mine was discovered last week on the banks of the Sevier river, near Marysville. The vein is 50 to 75 feet wide and is from 80 to 90 per cent pure. The alum can be extracted by simply placing the crude material in boiling water.

THE Nevada Tribune says: The losses by discount on silver bullion from Norcross amounted during the past year to \$123,768 53, and the Sutro tunnel royalty to \$32,398 86.

heavy lag-screws five inches long, the heads of which are reinforced by wrought-iron washers 2x3 inches, which grip the base of the rail.

The cable consists of two sections. The upper one, 4360 feet long, and depended upon for the real work, is passed over an eight-foot sheave at the summit, and to its ends are attached the two cars, giving the well-known balanced hoist where power is applied at the upper end. In this case, owing to the necessity for applying the power to the lower end of the system, the ends are spliced below the cars to the two ends of a second section of cable, thus forming a continuous driving-rope. The center of the lower section passes over the grooved driving and tightening pulleys, arranged as shown in Fig. 4.

A large surplus of strength is allowed for in the upper or working cable, the maximum load being five tons, while the breaking strain is 50 tons. This cable is 1½ inches in diameter and composed of six strands of 19 wires each. The

ing to keep the cable uniformly taut, and allowing for changes of temperature or strains of any violent nature. The engines are controlled absolutely by a system of levers extending into the tower of the engine-house, the engineer having an unobstructed view of the cars at nearly all points on the line.

The boilers carry 75 pounds working pressure, and consume from 1600 to 2000 pounds of bituminous coal per day (the cars making from 18 to 24 trips) or about 90 pounds of coal per round trip. The throttle, an ordinary 4-inch globe valve, is only opened from one to two-thirds of a turn for the heaviest loads, while the full opening requires five complete turns. With this small amount of steam the engines make about 160 revolutions per minute, the valves being set to cut off at two-thirds stroke. The expenditure of power is surprisingly slight, when account is taken of the stiffness of cordage, weight of cable resting upon and moved rapidly over 150 grooved pulleys, passed at

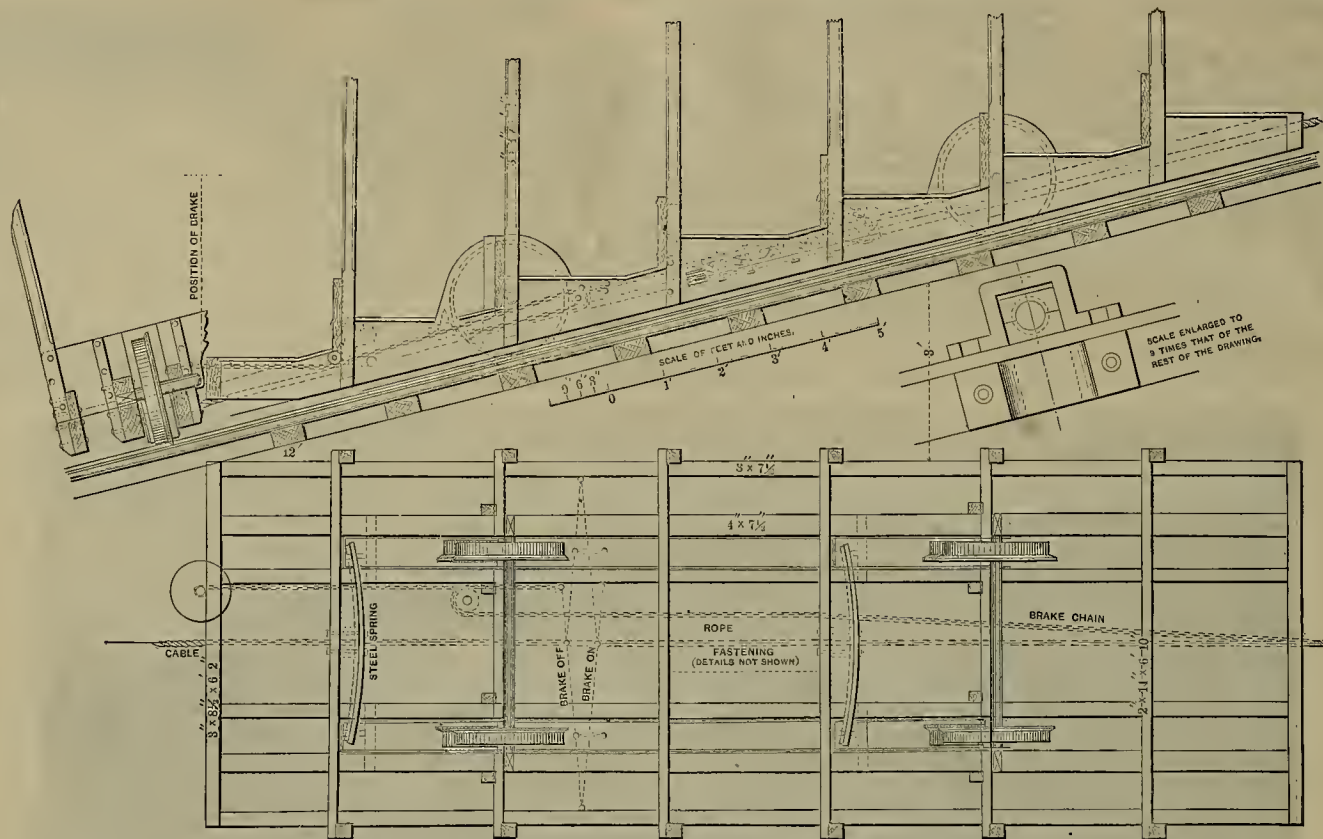


FIG. 3—DETAILS OF BRAKE FOR CAR USED ON INCLINE.

right angles through the power-plant, head and tail pulleys, etc.

The importance of telegraphic relations between the cars and engine room was duly considered, and a very simple plan was devised by which either conductor can signal directly to the engineer from any part of the line whether the car is moving or standing still.

The arrangement may be readily described without drawings, as follows: A small eight-cell Leclanche battery and an electric gong are located in the engine-room. One pole of the battery is connected with a hearing of the main sheaves and thus with the cable, which forms the ground circuit. The other pole is connected through the magnets of the gong to an ordinary telegraph wire stretched between the rails and supported by insulators that do not rise above it, the wire being about six inches above the ties. To complete the circuit all that is necessary is to connect this wire with the cable, and this can be done at any point of the line by pressing a spring upon the wire, the other end of the spring being connected with the cable where it is attached to the car.

To guard against mistakes or possible failures to make the proper signal when in motion, it is understood that any signal whatever, when the engine is in motion, means "stop!" but a "start" requires a certain definite signal which can, of course, be easily and deliberately made, as the car must be standing still when such a signal is required. This last signal is such that it could hardly be counterfeited by accidental contact of the wires or by malicious persons. It should be noticed that, even if the cable were to be broken at any point, there will always be a connection one way or the other back to the engine-house, and if a car should jump the track the spring would come in contact with the insulated wire and thus give an instant signal to stop the engine.

Fig. 2 shows the construction of the cars, which were built as low as possible, and are provided with a special form of brake shown in Fig. 3. This brake acts in an entirely different manner from the common style of car-brake, the conductor being obliged to hold it off during the entire trip, or whenever the car is in motion. If, by accident or design, the hand-wheel is released, the brake is instantly forced under and against the front of each wheel, so as to lift the wheels entirely off the track, thus converting the car into a sled, of which the brakes are the runners.

The bottoms of the brakes now have soles of wrought-iron with short steel pins (24 in number) projecting slightly from the surface and sharpened like an engraver's tool. It is proposed to try a shoe with a V-shaped groove to take the head of the rail, the amount of

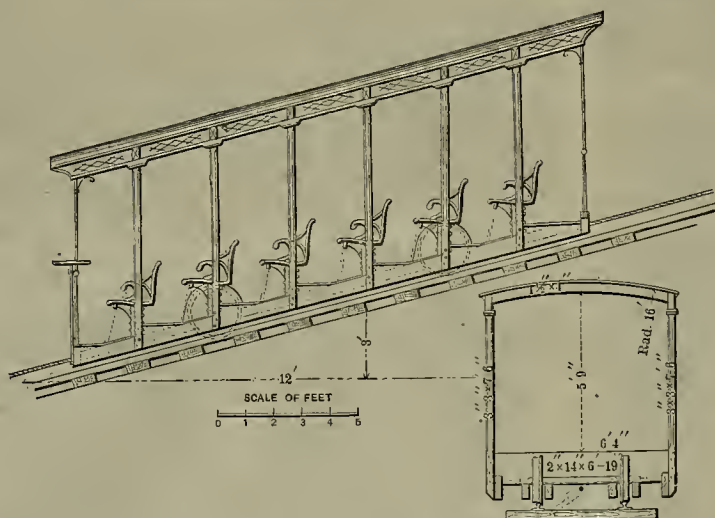


FIG. 2—CAR FOR LOOKOUT MOUNTAIN INCLINE.

friction being increased by the sharpness of the angle into which the head of the rail will be wedged by the weight of the car and load.

An automatic attachment causes the brake to set in the same manner in case the cable should part, even if the conductor should continue to hold on to the wheel; and still another and independent automatic grip is contemplated, to be actuated by a governor attached to the car axle.

It should be added that the springs which actuate the brakes are not required to be bent more than six to eight minutes at a time, and will not be likely to take a "set," as is the case with springs on some forms of hoisting machinery which are kept under strain for months at a time.

Fig. 1 is a view from the lower terminal, showing in perspective nearly the whole of the line. By comparison with the engravings given in the Press of Dec. 1, 1888, these give a good notion of the work and of the topographical difficulties surmounted.

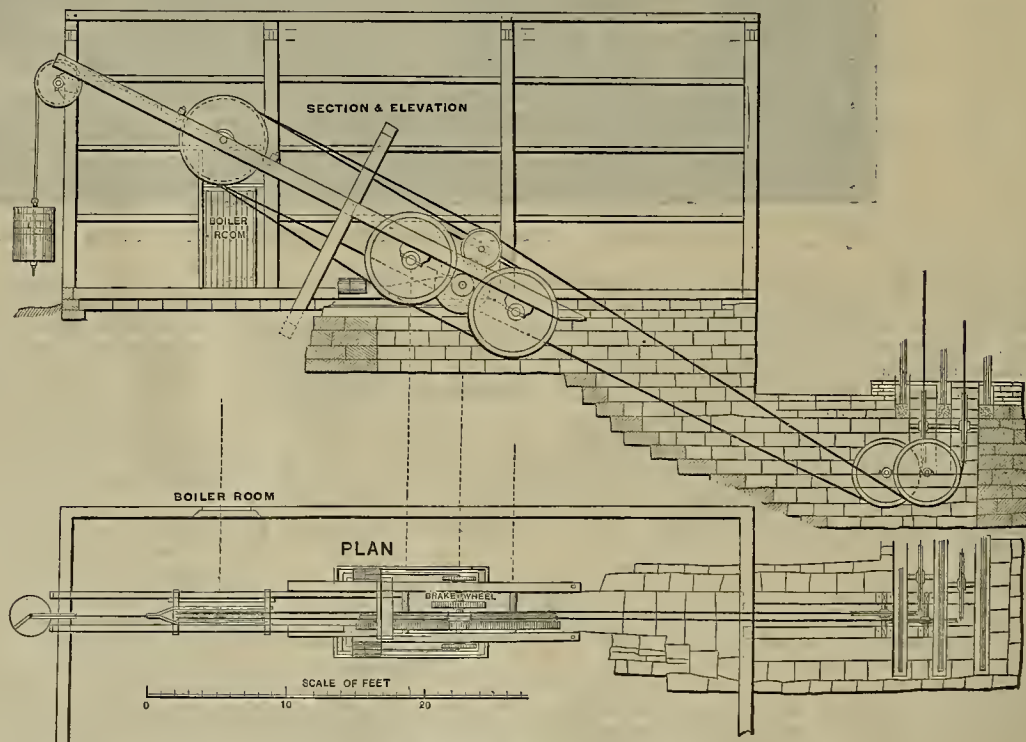


FIG. 4—VIEWS OF THE ENGINE HOUSE AND PLANT.

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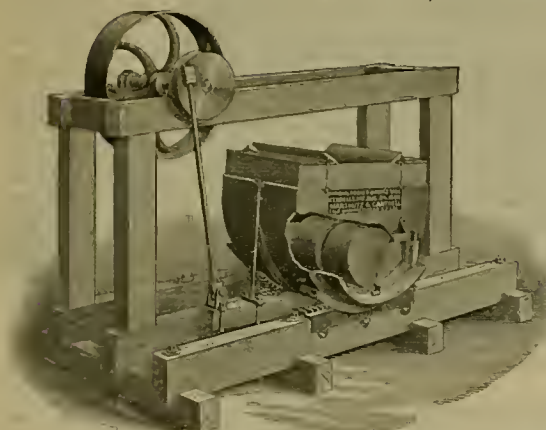
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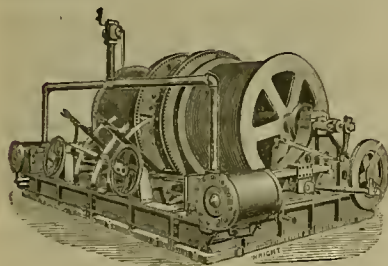
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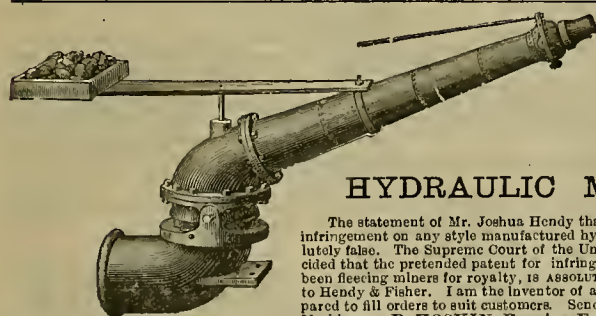
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Gold Mining Company, Sierra City, Cal., A. Schubert, President, Alvin Fischer, Secretary, A. Leder, Superintendent. Divided into 300,000 shares at \$1 each. Property comprises two locations. Ore assays \$7 per ton, average. Coarse gold, solid rock; vein from 15 inches to 2 feet wide. Tunnel No. 1 in 120 feet, and prospects well. No. 2 just begun. Stockholders: Alvin Fischer, A. Schubert, Gus Fischer, F. L. Fischer, Anton Fischer, Fred Fischer. For information concerning stock, etc., apply to F. L. Fischer, Sierra City.

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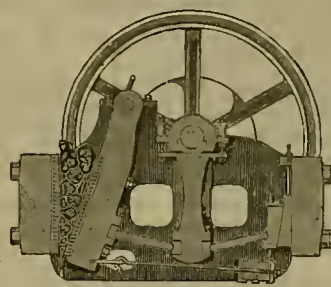
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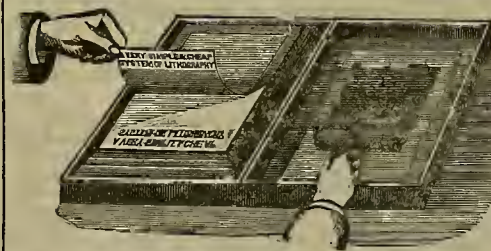
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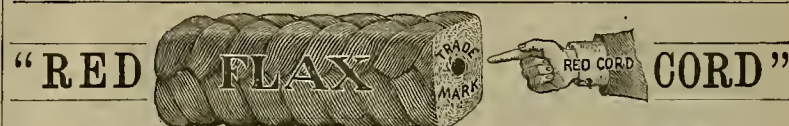


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Photographs of the Eclipse.

A great many photographers are preparing to use their cameras during the eclipse next Tuesday, and it is probable that more photographs will be taken during this phenomenon than has ever been the case at a preceding one. With one party alone which goes to Cloverdale there will be 25 cameras, one of them an exceptionally large and fine one. All of the parties which go to make exact observations will have one or more cameras. Many of the negatives will be sent to the Lick Observatory, and engravings will be made from them.

Photographs of the corona of very considerable scientific value can be made with an ordinary photographic apparatus and dry plates. With this view the camera should be filled with the largest and longest focused lens to be obtained, and then should be carefully focused with the full aperture upon some distant object. The image will be well defined over a small space in the center of the ground glass only. Two or three minutes before totality, six or eight plates should be in readiness. The ordinary tripod will scarcely do to support the camera, as the sun will be at considerable altitude.

The focus of the lens remaining as it was when adjusted on the distant object, as soon as totality commences and the operator has assured himself that the image of the corona is in the center of the ground glass, the plate may be exposed. By using a finder, many plates may be exposed during the totality, as time will be saved in knowing exactly when the image is in the center of the plate.

Valuable experience may be gained by photographing light clouds away from the sun, or near the sun, when it is obscured by heavy clouds, or just after sunset. Several exposures made in this way will show which one is best suited to give all the details of cloud forms, and this exposure (and stop) is best adapted for photographs of the corona. With the full aperture of a portrait lens, the maximum time should not exceed five seconds. One plate should be exposed with the smallest stop and the shortest time with the cap; another with the same time and an intermediate stop. By thus varying the amount of light received by the plate, there is more likelihood of obtaining a successful picture, showing the delicate details of the corona.

On account of the motion of the earth while the plate is being exposed, the image of the sun—or rather of the moon which covers the sun—will be a little blurred and somewhat oval in shape on the negatives; but it must be remembered that the portrait lenses in ordinary use have such short foci that they can give but very small pictures of the moon. The actual size in inches will be nearly as follows, viz.: With a 1-4 lens (focus about 5 inches), 0.04 inches; with a 1-2 lens (focus about 8 inches), 0.07; with a 4-4 lens (focus about 10 inches), 0.09; and with an extra 4-4 lens (focus about 16 inches), 0.14. The diameter of the extreme outlying portions of the corona may be four or five times these figures.

It is hoped that photographers making pictures in this manner will send the original negatives to the Lick Observatory; but if they prefer to retain them, it is earnestly requested that they will, at least, send positive copies on glass. Paper prints are useless for scientific purposes.

Each plate should be accompanied by a statement of the kind of lens used in its production; the focal distance and aperture of that lens; the diaphragm employed; the kind of plates used; how long each plate was exposed, and the means of identifying the top. The latter point is of especial importance, and the upper side of every plate must be carefully marked when it is put in the holder, because the character of the corona is such that without this precaution it may be impossible to say certainly which is the top of the negative.

It is desirable, though by no means essential, that every photographic observer should be provided with an assistant to record for him. The record should be made in pencil, on pieces of white card-board, cut to a convenient size. Each observer should be provided with colored or smoked glass to view the sun during the partial phase, so that he may not be dazzled, and lose precious time when the totality comes on. A couple of photographs of the sky, taken just before and again after totality, will be in-

teresting to show the position and motion of the clouds. For these negatives the smallest stop should be used and the time made as short as possible—preferably with an instantaneous shutter.

When great accuracy is not necessary, the simplest way to orient the pictures is to take a couple of instantaneous views of the sun 15 or 20 minutes before totality, and about one minute apart, upon the same plate (the driving clock of the telescope being stopped in the meantime, if the camera is mounted on a telescope stand). Take two more about the same interval after totality. The mean direction of motion of the cusps on these two plates should give the direction of the circle of declination during totality, within 10 or 15 minutes of arc.

The plates should be numbered with a soft pencil on the corner of the film before removing them from the plate-holder. The intended exposure for each plate should be indicated in large white letters on the slide. The black tablet slides are very convenient for this purpose, as the figures may be chalked directly upon them.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

From the official report of U. S. Patents in DEWEY & Co.'s Patent Office Library, 220 Market St., S. F.

FOR WEEK ENDING DEC. 18, 1888.

- 394,902.—HORSE-BRUSHING MACHINE—C. Alexander, S. F.
394,550.—FRUIT-PICKER—F. & G. W. Ansley, Medical Lake, W. T.
394,636.—GOLD-SAVING APPARATUS—O. H. Bagley, Knappa, Ogn.
394,553.—WINDOW-BLIND—F. A. Bernard, San Bernardino, Cal.
394,641.—VINEYARD HOE—E. Cartwright, Lincoln, Cal.
394,677.—STATION INDICATOR—A. E. Crucuel, S. F.
394,769.—ROLLER BEARING—R. W. Hent, S. F.
394,575.—CIGAR-HOLDER—D. B. James, S. F.
394,654.—CONCENTRATOR—J. A. Jones, Tuscarora, Nev.
394,720.—LAMP-FILLER—M. W. Paxson, Virginia, Nev.
394,662.—BALING-PRESS—Jacob Price, San Leandro, Cal.
394,664.—CAN TESTER—W. H. Smyth, Berkeley, Cal.
394,741.—STATION INDICATOR—W. A. Turner, S. F.
394,799.—STATION INDICATOR—W. A. Turner, S. F.
16,098.—TRADEMARK—Aleutian Islands Fishing & Mining Co., S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VINEYARD OR FARM HOE.—Edgar Cartwright, Lincoln, Placer Co. No. 394,641. Dated Dec. 18, 1888. This hoe is specially adapted for use on farms or vineyards. The object is to provide a simple hoe, the blade of which may be readily attached or detached from the handle for sharpening, or the substitution of another blade.

CAN TESTING MACHINE.—Wm. H. Smyth, Berkeley, assignor to King-Morse Canning Co., S. F. No. 394,664. Dated Dec. 18, 1888. This is a machine for determining whether the seams of cans have been properly soldered before they have been filled. It consists of an inclined rotary table or carrier, into which the cans are placed, one side of this carrier passing beneath the surface of hot water in a containing tank, so that as the cans are carried beneath the water, escaping bubbles will indicate the leaky ones. It consists also of a mechanism for discharging and drying cans, a mechanism by which the defective cans may be separated from the good ones and discharged into another chute, and in certain details of construction. The defective cans are discharged automatically and separated from the good ones.

STREET OR STATION INDICATOR AND CARD-DISPLAYING DEVICE.—Wm. A. Turner, S. F. No. 394,741. Dated Dec. 18, 1888. The object of this device is to construct an appliance which shall utilize all the space in the indicator-box for the successive display of cards or signs bearing names or other matter. The invention consists essentially of a box or case whose front, with the exception of a small space at the upper left-hand corner, is transparent and which is filled, or nearly filled, by two sets of advertising cards or plates, together with mechanism by which one set is forced toward the front and the other toward the rear of the box, and, in combination with this, of pulling grips by which

the front plate is pulled to one end and the rear plate is pulled to the opposite end, the two being simultaneously drawn in opposite directions together, with the mechanism for operating the same.

DEVICE FOR ACTUATING STATION INDICATORS.—Wm. A. Turner, S. F. No. 394,799. Dated Dec. 18, 1888. This is a mechanism for actuating station indicators; and it has for its object the conversion of the sudden strain resulting from the striking of the actuating device against the tripping device or obstruction in the roadway into a prolonged and uniform pull and avoidance of erroneous indications through the hacking or irregular motion of the car. It consists of one or more tripping blocks or obstructions at the point upon the track where the indication is desired, a lever or levers fulcrumed upon the car so as to be actuated by these obstructions, a screw fixed upon the revolving car axle, and a device which is caused to engage the screw by the movement of the tripping-levers and through which the indicator is actuated.

GOLD-SAVING APPARATUS.—Olin H. Bagley, Knappa, Oregon. No. 394,636. Dated Dec. 18, 1888. This apparatus comprises a fixed bed frame, a shaking frame suspended from and above the fixed bed frame, and a third frame suspended from and within the shaking frame, so that it receives a peculiar movement due to the movement of the shaking frame and the bumping it receives from it. This third frame carries one or more concentrating tables, the surfaces of which are corrugated or fluted, and each has discharge openings in its ridges or elevated portions. The frame also carries a screen-plate, between which and the concentrating table is a perforated directing plate to guide the material directly into the hollows of the table. By the shaking movement of the table, the precious particles are settled in the hollows while the worthless material passes through the openings in the ridges.

BALING PRESS.—Jacob Price, San Leandro. No. 394,662. Dated Dec. 18, 1888. This press is of the horizontal type and is mounted on wheels so as to be easily transported. It has a central double-header follower and mechanism for operating the same, so that each end of the follower acts alternately to compress the hay in its end of the press-box. Each of these ends has a feed opening or well with a door which may be closed when the well is full and ready for the follower to act on its contents, and which is opened automatically by the follower after the hay has been forced beyond the feed opening and before the follower returns. By the time the horses have been reversed on the lever the other end of the press is ready to receive another charge and may again be filled. This process is repeated until there are, for example, three charges in one end, which will complete the bale, and two in the other end, and the driver may leave the horses and assist in tying the completed bale. While this is being done the third charge for the other bale is being put in by the feeder. The instant the first bale is tied the horses are started and it is discharged, and the last charge being pressed in the opposite end, the other bale will be ready to be tied. While this is being done the empty end of the press receives its first charge for the second bale, and so the process is continued without loss of time. By the peculiar arrangement of the mechanism for actuating the follower, the latter may be given a long travel and moved at considerable speed during the first portion of its travel when power is not necessary, and the whole power of the team is concentrated at the end upon the last portion of its movement.

Testing and Working Silver Ores

An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope.

Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the heading of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride of iron, amalgam, Patchen's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the heading of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroeck's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quick-silver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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About Obtaining Patents.

Patents are Virtually Contracts.

The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence, it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

Secure a Good Patent.

An inventor should first ascertain whether or not his improvement has been patented to another. This requires an exhaustive search among all the patents in the class to which the invention relates. If, by this "preliminary examination," the improvement is found to have been previously invented, our client will receive, for the small sum of \$5 for the examination, a verbal or written report showing definitely wherein his invention has been anticipated, thereby saving him further expense and perhaps much time, anxiety, etc.

To avoid all needless delay, however and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & Co. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1860, a period of 28 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories, enables them to understand the wants of inventors on this coast more readily and thoroughly, as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily—when distant agents are employed—is wasted in preliminary writing back and forth.

This happy combination of long business experience together, and wide connections, has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly-stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is, that it entitles the inventor to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the inventor is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$25. The Government fee is \$10 additional. To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

Inventors doing business with us will be notified of the state of their application in the Patent Office whenever it is possible for us to furnish such information.

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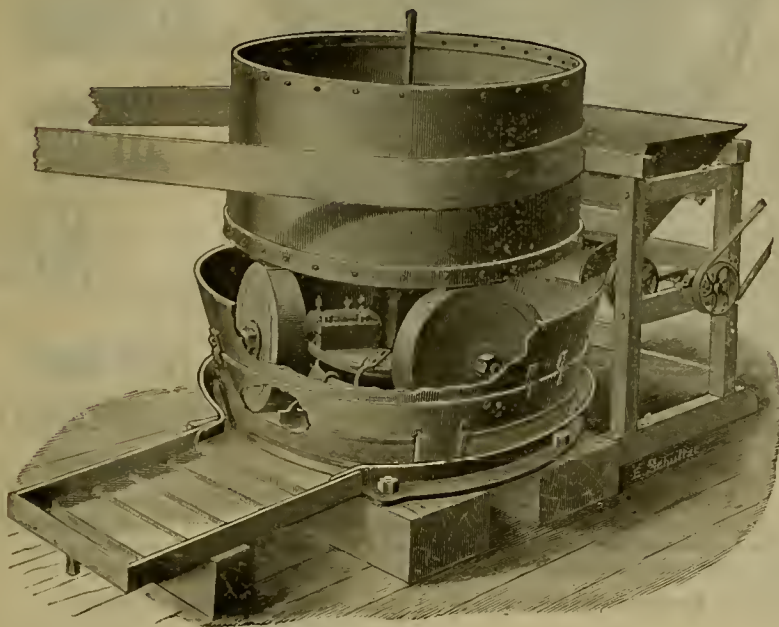
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Full Descriptive Circulars of any of the above sent on application.

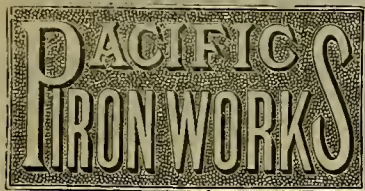
OFFICE OF THE CADELARIA CONSOLIDATED MEXICAN MINING CO.,
SAN DIMAS, DURANGO, MEXICO, October 25, 1888.

Risdon Iron Works, San Francisco—GENTLEMEN: Our Company has been operating three of the 4-foot Bryan Roller Quartz Mills one of which has been running steadily for three years, one for two and one for one year. Our quartz is very hard, we crush through a No. 60-mesh screen. Our mills run 55 revolutions per minute, and each crush through 80-mesh screen 12 tons in twenty-four hours; through 50-mesh, 15 tons; and through 40-mesh, 18 tons. This proportion has been continuous. One set of Dies will crush from 1500 to 1600 tons. One set

of Tyres will crush 1600 tons. One ring plate will crush from 2200 to 2300. The mills require very little attention. At our mill an ordinary "peon" earning one dollar per day has complete charge. In regard to slitting, in comparison with stamps by reason of the discharge surface and the continuous agitation by the scrapers, a much less amount of slime is created. A three years' experience teaches me that, in every respect, the mills are a complete success and of material benefit to the mining world. They can be set up and running in 48 hours, and can be dismounted in the same time and removed to wherever desired. Ours were packed on our mule trail over as difficult a road as any in Mexico. As a gold amalgamator, it is unequaled by any mill now in existence.

Yours truly,

D. M. BURNS, Superintendent.



1850. — BUILDERS OF — 1888.

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WHAT IS SAID OF IT BY ONE WHO HAS USED IT THREE YEARS.

OFFICE OF ERNEST L. RANSOME, MANUFACTURER OF ARTIFICIAL STONE AND CONCRETE,
No. 508 CALIFORNIA STREET, SAN FRANCISCO, November 9, 1888.

Pacific Iron Works—GENTLEMEN: In answer to your request for my experience with the Gates Crusher would say, that I have used one for the past three years crushing trap rock, basal, and granite for making concrete, the most of it being very hard and calculated to test severely the strength and durability of any machine.

I have crushed in that time probably not less than 10,000 tons of this material, without any repair being necessary, and without any change of shoes and dies, and, as far as I can judge, they appear to be good for as much more service.

I have had more or less experience with nearly every crusher in the market, and regard the Gates as infinitely superior to them all. In fact its efficiency, durability and capacity for work is simply wonderful. For crushing all kinds of ore, ballast or macadam—fine or coarse—nothing can compare with it. You are at liberty to refer any parties to me who may want further evidence as to the merits of this remarkable machine. Very truly yours,

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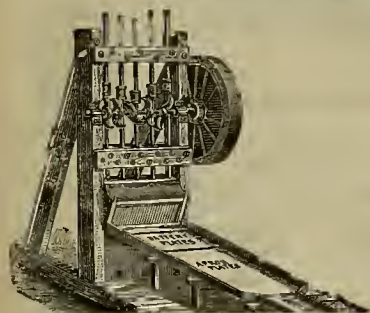
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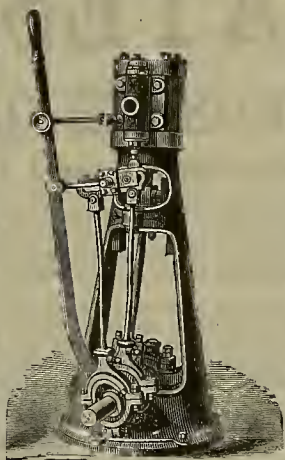
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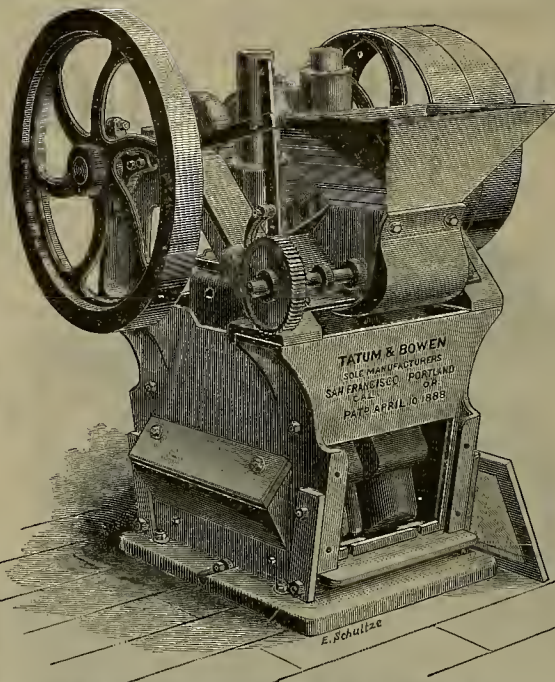
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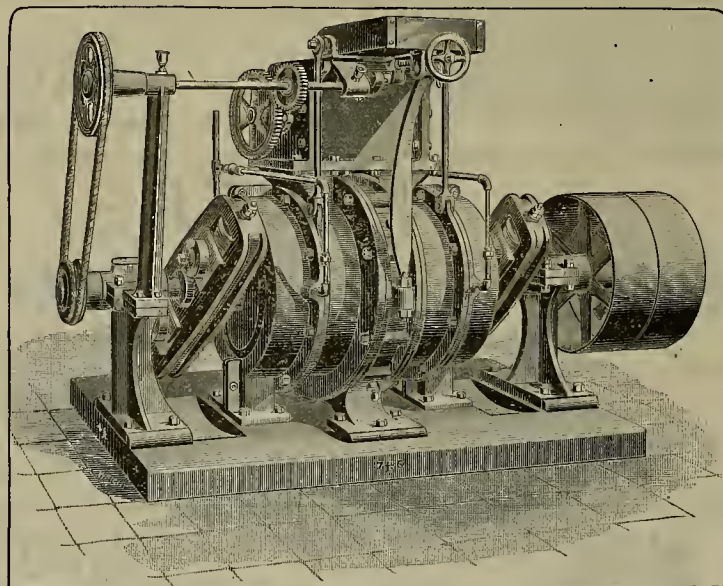
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IT HAS NO MORE WEARING PARTS THAN CORNISH ROLLS,

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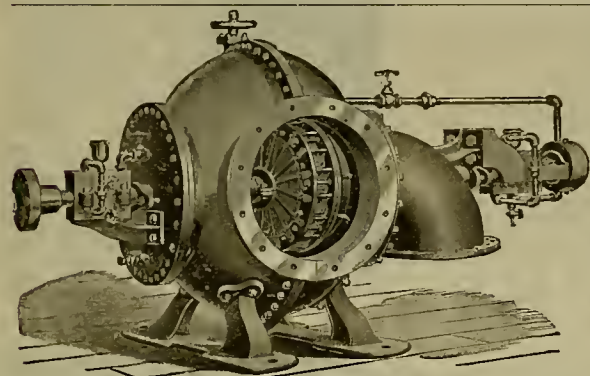
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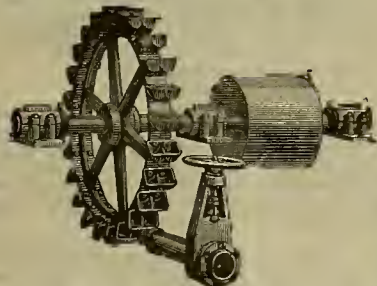
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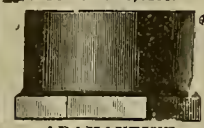
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MARKET REPORTS.

Local Market.

SAN FRANCISCO, Dec. 27, 1888.

General business the past week was as usual at the close of the year of a holiday character. This inactivity is expected to obtain until after the turn of the year. Owing to the easy money market and a more general accumulation of funds after next month from interest and dividend disbursements, there is a growing impression that the forepart of 1889 will show more general activity in all branches of trade and industries than witnessed for some time. Considerable money was paid out the past two weeks for taxes, but then this is not felt in any one quarter. The various machine, foundry and iron works in general, anticipate a more active time in the near future. Cheaper coal is assured by new freights from Australia, which will be quite a factor in bringing about the improvement. Heavy deposits of snow in the mountain ranges assure a liberal supply of water for the mines well into 1889, and with a better system of working many of the mines, a very prosperous season is looked for. The Mining Stock Association, counting as it does several very wealthy members, proposes rectifying the abuses that have crept into the management of the Comstock mines. This action on the part of the association is already being favorably felt. Another important factor for the future prosperity of the Comstock is the final settlement of the Suto tunnel on Jan. 1, 1889. After that date the tunnel will pass into the control of parties who propose pushing the work and developing the property for the best interest of the Comstock mines. The tunnel is to be extended west through and from the Savage ground. News from the various mining districts is of the most flattering character, auguring well for a prosperous year in 1889. This is particularly the case from the Comstock, where the mines are being opened up for the taking out of increased quantities of ore from the older mines and the development of others not now listed on the stock exchanges, particularly those located on the West or Red Lode. News from Virginia City reports another important development in Con. Virginia, and also that the Crown Point developments are proving larger and richer than before claimed. Work in the other mines is being vigorously prosecuted, but kept as quiet as possible, probably for stock manipulation purposes. From the Tuscarora, Quji-ton and Bodie districts there is nothing of particular interest to report further than they are preparing for an active season.

SILVER—The market has been steady and firm throughout the week at 92½ to 93½. The supply of bullion continues light, but a decided increase is looked for in next month owing to all the mills on the Carson river now running to full capacity and the other mills in the district either running to full capacity, or will be very soon, unless for stock manipulation purposes they are delayed.

QUICKSILVER—The market is very firm at advance. The demand is reported to be exceedingly good. The consumption next year is expected to be fully 25 per cent greater than that of 1888.

LEAD—The market shows a steady and fairly firm tone. Some increase in the inquiries is reported from consumers, but no marked improvement in the demand is looked for until the coming season opens. Eastern mail advices are not encouraging to the selling interest, causing an easier tone to prevail.

COPPER—The market is inactive. Confirmed reports are received of more mines being opened up in Nevada and Arizona. Mail advices from the East report a steady increase in the visible supply of copper, which creates in certain quarters a bearish feeling, causing more cutting in the market prices for manufactured copper and brass goods. The syndicate stock of copper at the moderate price of \$50 per ton reaches the sum of \$25,000,000.

TIN—Pig tin begins to be taken more freely. Spot tin plate is firm, as is that nearly due and to arrive in the spring. For prompt shipment, the market is reported to be easier. The consumption in 1889 will be fully 20 per cent more than it was in 1888.

COAL—Spot house coals are weaker under heavy receipts. Steam-coals are reported firm by sellers, but consumers report the market easier for both spot and on passage. For prompt shipment prices are lower and irregular owing to a decline from Australia freights to this port. It now looks as if 1889 will witness very low prices to what they were in this year, for both steam and house coals.

IRON—The market continues dull and inactive, with quotations more or less nominal.

Eastern Metal Markets.

By Telegraph.

NEW YORK, Dec. 27, 1888.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper.	Lead.	Tin.
Thursday	42 5-16	92 3/4	\$17 20	\$3 75	\$21 80
Friday	42 5-16	92 3/4	17 25	3 80	21 80
Saturday	42 5-16	92 3/4	17 40	3 76	21 76
Sunday	42 5-16	92 3/4			
Tuesday	42 5-16	92 3/4			
Wednesday	42 5-16	92 3/4	17 20	3 20	21 80

Quicksilver is unchanged. Borax is steady and in fair demand. California refined would bring 7½ c. Copper is dull and nominal at 17½ to 17¾ c; casting, 16 to 16½ c. Pig lead was dealt in in a small way at 33.72½ to 33.50. Large consumers are unwilling to pay \$3.70. Petroleum is dull. Refined, barrels, \$7.30; plain cases, \$9.20.

By Mail.

The following is the latest from the "New York Metal Exchange Market Report":

Prices generally ruling for metals not regularly dealt in on call at the N. Y. Exchange, covering extremes of buyers' and sellers' views. All prompt delivery. Australian Tin, @—; Billiton Tin, \$24.50; Banca Tin, \$24.25 to \$24.50; Baltimore Copper, @—; Orford Copper, \$16.00; 16.25; P. S. C. Copper, @—; Foreign Lead, \$4.75 to \$5.00; Foreign Spelter, \$5.00 to \$5.25; Antimony, \$10.00 to \$13.50.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, Dec. 27, 1888.

ANTIMONY—French Star	13 3/4	14 3/4
BORAX—Refined	7 1/2	7 3/4
Powdered	7 1/2	7 3/4
Concentrated	8 1/2	8 3/4
COPPER—		
Bolt	20 1/2	21
Sheeting	20 1/2	21
Ingot	16 1/2	16 3/4
Fire Box Sheets	—	26
Iron—Glengarnock ton	—	—
Eglinton, ton	—	—
American Soft, No. 1, ton	—	—
Oregon Pig, ton	—	—
Clay Lane White	—	—
Shot, No. 1	—	—
Bar Iron (base price) 10 lb	2 1/2	3
Chrome iron ore, 1/2 ton	8 00	10 00
LEAD—Pig	5 1/2	5 3/4
Bar	5 1/2	5 3/4
Sheet	5 1/2	5 3/4
Pipe	7 1/2	7 3/4
Shot, discount 10% on 500 bags Drop, 1/2 bag	1 55	1 55
Buck, 1/2 bag	1 75	1 75
Chilled, do	1 75	1 75
Strain—English, 10 lb	16 1/2	16 3/4
Canton tool	9 1/2	10
Black Diamond tool	10 1/2	10 3/4
Pick and Hammer	8 1/2	8 3/4
Toe Chalk	4 1/2	4 3/4
TINPLATE—Coke, prompt shipment	4 85	4 90
Coke on spot	—	—
Charcoal, 14x20	6 75	6 75
do roofing, 14x20	5 50	5 52
Pig tin, 10 lb	23 1/2	25
QUICKSILVER—By the flask	—	—
Flasks, new	1 06	1 06
Flasks, old	85	85
COKE—English, ton	20 00	20 00

PRICES OF COAL "TO ARRIVE."

	Per Ton
Australian, \$10 to \$11 40 Cardiff	10 50 to 11 00
Liverpool Steam 11 00 to \$11 60 Leigh Lump	20 00 to 20 50
West Hartley, 11 60 to \$12 50 Cumberland bkls	10 18 to 10 50
Scotch Splint, 11 00 to \$12 00 Egg, hard	16 50 to 17 00

Mining Share Market.

The dullness of holiday week in ordinary business circles has scarcely added to the dullness and inactivity of the stock market, for there is not much room for anything in that direction. The market has been flat for a long time, notwithstanding encouraging work up on the Comstock. Monday's Virginia Chronicle says: The flow of the Carson river has been augmented by the recent snow and rainfall to a volume sufficient to operate all the stamp mills along its course to their full capacity. It is probable that there will be a material increase in the daily ore shipments from the Hale and Norcross and Confidence. The Con. California and Virginia has already increased its daily ore shipments to the Eureka from 168 to above 200 tons. The fall of snow in the mountains has not yet been of sufficient importance, however, to keep the Carson bank full for a prolonged period.

Coll Deane, Robert F. Rogers, R. W. Collins and M. W. Fox have filed a complaint in the Superior Court against the Challenge Mining Co. to set aside the election of A. K. P. Harmon, J. D. Fry, William Norris, J. H. Dohneon and James Newlands as directors of the Challenge Consolidated Co. The petitioners allege that they were elected by proxies given by a number of stock brokers who were not bona-fide owners of the stock which they purported to represent at the time of the election. This is a test case, and a very important one to owners of mining stock, as it is intended to remedy an existing evil. Some of these days we will succeed in getting the mining companies conducted on a better basis than is at present the case, when mining stocks may be dealt in with better results by small holders.

Bullion Shipments.

We quote shipments since our last, and shall be pleased to receive farther reports:

Confidence, Dec. 23, \$32,437; Overman (for December), \$3458; Challenge, 23, \$8906; Peerless, 27, \$5885; Mt. Diablo, 27, \$7945; Hale and Norcross, 25, \$15,592; Con. California and Virginia, 25, \$46,880—total to date on December account, \$106,977; Pamlico, 22, \$36,000; Hanauer, 18, \$3600; Queen of the Hills, 19, \$2200; Hanauer, 19, \$1830—20th, \$1900; Woodside, 20, \$10,200; Hanauer, 21, \$1675; Crescent, 32, \$6400; Woodside, 24, \$5830.

Those who simply want to look at the eclipse without instruments can prepare a piece of ordinary smoked glass. This can be made of a small pane of good window-glass by holding it over the flame of a lamp or candle until a black film is deposited. If possible, it should be smoked so that the tint will be so dense at one end that the full light of the sun seen through it will not dazzle the eye, while at the other the film should be so thin that objects in an ordinary lighted room may be seen distinctly through it. Smoke the glass as evenly as possible from one end to the other. Paste a narrow strip of thick paper across each end of the glass, on the smoked side, and lay it on a sheet of unsmoked glass of the same size. Then secure the two sheets together by a strip of paper pasted around the edges of both plates.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, term of subscription, and give it their own patronage, and as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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ASSESSMENTS.

COMPANY.	LOCATION.	No.	AM'T.	LEVIED.	DELINQ.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Big Canyon G M Co.	California.	1.	20.	Dec 20.	Jan 22.	Feb 7.	T. W. Nolin.	230 Montgomery St
Commonwealth Con M Co.	Nevada.	7.	50.	Nov 24.	Dec 28.	Jan 21.	H. Deas.	309 Montgomery St
Concordia M Co.	Nevada.	2.	50.	Nov 12.	Dec 24.	Jan 12.	G. O. Higgins.	121 Montgomery St
California State Co.	California.	3.	30.	Dec 13.	Jan 19.	Feb 18.	J. O. Hanscom.	10 California St
4th Western Quicksilver M Co.	Cal.	3.	10.	Nov 28.	Jan 7.	Jan 28.	A. Halsey.	13 Fremont St
Gover M Co.	California.	1.	15.	Nov 28.	Jan 5.	Jan 22.	L. G. Harvey.	328 Montgomery St
Gray Eagle M Co.	Nevada.	10.	05.	Nov 13.	Dec 18.	Jan 8.	O. H. Bogart.	327 Pine St
Horseshoe Bar Con M Co.	California.	2.	10.	Dec 7.	Jan 14.	Feb 4.	D. M. Kent.	330 Pine St
Kosuth M Co.	Nevada.	10.	50.	Nov 27.	Dec 24.	Jan 19.	B. P. Flint.	328 Montgomery St
Lord of Lorn M Co.	Nevada.	4.	10.	Nov 13.	Dec 28.	Jan 22.	L. G. Harvey.	313 California St
Live Oak Drift Gravel Co.	California.	10.	05.	Nov 19.	Dec 21.	Jan 16.	J. Morizio.	328 Montgomery St
Montrose M Co.	Colorado.	1.	14.	Oct 3.	Dec 24.	Jan 28.	F. E. Luty.	330 Pine St
North Gould & Curry M Co.	Nevada.	10.	20.	Dec 18.	Jan 18.	Feb 4.	O. H. Mason.	331 Montgomery St
Nevada Queen M Co.	Nevada.	4.	50.	Dec 21.	Jan 28.	Feb 25.	H. Deas.	309 Montgomery St
Omlak M Co.	Alaska.	6.	20.	Dec 4.	Jan 5.	Jan 24.	D. M. Kent.	330 Pine St
Russian Reduction & M Co.	California.	4.	05.	Dec 15.	Jan 21.	Feb 12.	J. Morizio.	328 Montgomery St
Sierra Nevada Co.	Nevada.	93.	25.	Nov 9.	Dec 13.	Jan 2.	E. L. Parker.	309 Montgomery St
See Belcher & Mides Con M Co.	Nev.	2.	25.	Dec 3.	Jan 7.	Jan 28.	E. B. Holmes.	309 Montgomery St
Wm Penn M & M Co.	Nevada.	3.	10.	Nov 8.	Dec 17.	Dec 31.	J. J. Scoville.	309 Montgomery St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Alaska M & Co.	Alaska.	R. D. Fry.	420 Montgomery St.	Annual.	Jan 9
Bullion M Co.	Nevada.	R. R. Grayson.	327 Pine St.	Annual.	Jan 10
Chicago M Co.	Nevada.	A. S. Grot.	328 Montgomery St.	Annual.	Jan 7
Chemehuevi M Co.	Arizona.	F. P. Bull.	401 California St.	Annual.	Jan 8
Iowa M Co.	Nevada.	C. B. Higgins.	403 California St.	Annual.	Jan 7
Spring Valley G M Co.	California.	H. Picboir.	320 Sansome St.	Special.	Feb 26
Silver King M Co.	Arizona.	J. Nash.	328 Montgomery St.	Annual.	Jan 8
Shasta Iron Co.	California.	C. B. Morgan.	16 Fremont St.	Annual.	Jan 8

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Con California & Va M Co.	Nevada.	A. W. Havens.	309 Montgomery St.	50	Oct 11
Confidence S M Co.	Nevada.	A. S. Grot.	328 Montgomery St.	1.00	Aug 6
Caledonia M Co.	Nevada.	A. S. Grot.	328 Montgomery St.	50	Nov 26
Candelaria Con M Co.	Mexico.	C. T. Givens.	221 Market St.	50	Nov 12
Eureka Con M Co.	Nevada.	H. R. P. Hutton.	306 Pine St.	25	July 9
Mt Diablo M & Co.	Nevada.	R. R. Heath.	319 Pine St.	25	Aug 27
North Star M Co.	California.	D. A. Jennings.	401 California St.	50	Nov 11
Hale & Norcross S M Co.	Nevada.	J. F. Lightner.	308 Montgomery St.	50	Aug 8
Idaho M Co.	California.	—	Grass Valley.	60	Oct 11
Pacific Borax, Salt & Soda Co.	California.	A. H. Clough.	230 Montgomery St.	1.00	Dec 10

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 6.	WEEK ENDING Dec. 13.	WEEK ENDING Dec. 20.	WEEK ENDING Dec. 27.
Alpha	2.70	3.00 7/8	3.10 2/3	3.10 2/3
Alma	3.00	3.20 1/2	3.00 7/8	2.90 2/3
Andes	1.40	1.50 1/3	1.60 1/2	1.40 1/2
Argenta	—	—	—	—
Belcher	6 1/2	7.00 6/25	7 1/2	6.75 6/25
Best & Belcher	7 1/2	8.00	9.00 6/25	8.25
Bullion	1.50	1.60 1/4	1.50 1/4	1.45
Baltimore	—	—	—	—
Bodie	—	—	—	—
Bodie Con.	1.70	1.70 1/4	1.50 1/2	1.50
Benton	1.75	2.10 2/8	2.50	2.00
Bodie Tunnel	—	—	—	—
Bulwer	—	—	—	—
Con. Va. & Cal.	—	—	—	—
Challenge	6 1/2	6.75 5/8	6.00 5/8	6.50 5/8
Champion	—	—	—	—
Chollar	4.00	4.20 3/8	3.90 3/8	3.50 3/8
Confidence	—	—	—	—
Con. Imperial	—	—	—	—
Caledonia	—	—	—	—
Con. Pacific	—	—	—	—
Crown Point	5.50	6.25 5/8	6.50 5/8	7.00 5/8
Crocker	—	—	—	—
Dudley	—	—	—	—
East B. & B.	—	—	—	—
Eureka Con.	—	—	—	—
Excelsior	1.25	1.45 1/2	1.35 1/2	1.25
Grand Prize	—	—	—	—
Gould & Curry	4.50	4.70 3/8	4.40 2/4	4.50 3/5
Hale & Norcross	6 1/2	6 1/2	6.00 5/8	6.00 5/8
Holmes	—	—	—	—
Independence	—	—	—	—
Low	—	—	—	—
Julia	—	—	—	—
Justice	1.80	1.95 1/2	1.90 1/2	2.00
Kentuck	2.70	3.00	2.70 3/4	2.90 2/4
Lady Wash	—	—	—	—
Martin White	—	—	—	—
Mono	—	—	—	—
Mexican	4.90	5.25 4/7	5.25 4/7	4.95 4/7
Mt. Diablo	—	—	—	—
North Belle	—	—	—	—
Nevada	2.50	2.55 1/2	2.50 1/2	2.40 1/2
North Belle Isle	3.10	3.50 2/7	2.85 2/8	3.25 2/5
Niagara	—	—	—	—
Nev. Queen	2.50	3.50 2/8	3.00 2/5	3.40 2/5
North G. & S.	—	—	—	—
Occidental	2.70	2.80 2/10	2.25 1/8	2.10 1/8
Ophir	7 1/2	8 1/2	8 1/2	7.00
Overman	1.80	2.00 1/5	1.75 1/4	1.90 1/5
Potosi	3.70	3.75 3/5	3.40 7/8	3.15 3/5
Peerless	1.40	1.50 1/2	1.70 1/4	1.45 1/2
Peer	—	—	—	—
P. Sheridan	—	—	—	—
Silver Star	—	—	—	—
Savage	4.70	4.85	4.30 3/4	4.15 3/4
S. B. & S.	2.55	3.40 3/8	3.25 3/8	3.00
Sierra Nevada	3.80	4.00 3/4	4.00 3/4	3.15 3/5
Silver Hill	—	—	—	—
Silver King	—	—	—	—
Siorian	—	—	—	—
Syndicate	—	—	—	—
Union Con.	3.85	4.20 3/8	3.90 3/5	3.80 3/5
Utah	1.55	1.70 1/4	1.60 1/2	1.60 1/2
Yellow Jacket	5 1/2	5.50 4/9	5 1/2	5.50 4/9

Sales at San Francisco Stock Exchange.

THURSDAY, Dec. 27.		700 Justice	2.00
100 Alpha	2.65	50 Mexican	4.10
150 Belcher	—	200 New York	50c
235 B. & Belcher	—	100 N. Belle Is.	2.50
200 Baltimore	—	50 Nev. Queen	2.50
200 Bullwer	50c	200 Ophir	6 1/2
250 Bodie Con.	1.40	70 Overman	1.60
200 Bullion	—	400 Occidental Con	1.70
100 Challenge	—	70 Potosi	2.05
50 Chollar	—	150 Peer	4.50
110 Con Va. & Cal.	3.75	100 Savage	3.50
400 Con. Imperial	—	100 Sierra Nevada	3.15
50 Crocker	—	250 S. B. & M.	2.90
50 Crown Point	—	100 Utah	1.30
300 Grand Prize	—	300 Wm. Constock	—
450 Gould & Cray	3.65	50 Yellow Jacket	1.5c
25 Hale & Nor.	5c		

Assessment Notices.

Gover Mining Company—Location of principal place of business, San Francisco, California.
Location of works, near Drytown, Amador County, California.

NOTICE is hereby given, that at a meeting of the Board of Directors held on the 24th day of November, 1888, an Assessment (No. 1) of Fifteen (15) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 5th day of January, 1889, will be delinquent and advertised for sale at public auction; and unless payment is made before will be sold on Tuesday, the 29th day of January, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.
Office—13 and 15 Fremont Street, San Francisco, Cal.

Lord of Lorn Gold and Silver Mining Company. Location of principal place of business, City and County of San Francisco, State of California. Location of works, Cold Hill Mining District, State of Nevada.

NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 19th day of December, 1888, an Assessment (No. 4) of Ten (10) Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, No. 313 California street, San Francisco, California. Any stock upon which this Assessment shall remain unpaid on the 21st day of January, 1889, will be delinquent, and advertised for sale at public auction; and unless payment is made before will be sold on Monday, the 11th day of February, 1889, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

L. G. HARVEY, Secretary.
Office—313 California St., San Francisco, Cal.

DELINQUENT SALE NOTICE.

William Penn Mill and Mining Company. Location of principal place of business, San Francisco, California. Location of works, Devil's Gate Mining District, Lyon county, Nevada.

NOTICE.—There is delinquent upon the following described stock, on account of Assessment (No. 3) levied on the 8th day of November, 1888, the several amounts set opposite the names of the respective Shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Langridge, George.	30	1000	\$100 00
Langridge, George.	37	1000	100 00
Langridge, George.	38	1000	100 00
Langridge, George.	34	1000	100 00
Langridge, George.	54	1000	100 00
Langridge, George.	55	1000	100 00
Ledden, J. A.	46	20	2 00
Seawell, W.	48	2000	200 00
Seawell, Bullitt.	30	500	50 00
Seawell, J. M.	49	2500	250 00
Scoville, J. J.	33	10,000	1000 00

And in accordance with law, and an order of the Board of Directors, made on the 8th day of November, 1888, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, Room 59, Nevada Block, No. 309 Montgomery street, San Francisco, Cal., on Monday, the 31st day of December, 1888, at the hour of 2 o'clock p. m., of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of the sale.
J. J. SCOVILLE, Secretary.
Office—Room 59, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal.

STOCKHOLDERS' MEETING.

OFFICE OF

The Superior Mill and Mining Company.

A SPECIAL MEETING of the stockholders of the Superior Mill and Mining Company will be held at the office of the company, Room 11, 303 California Street, S. Francisco, California, on Wednesday, February 20, 1889, at 1 o'clock p. m., for the purpose of taking into consideration the increasing of the capital stock of said company from ten million (10,000,000) dollars, divided into one hundred thousand (100,000) shares of the par value of one hundred (100) dollars per share, to fifteen million (15,000,000) dollars, divided into one hundred and fifty thousand (150,000) shares of the par value of one hundred (100) dollars each. Transfer books will close on Monday, February 13, 1889, at 3 o'clock p. m. By order of the Board of Directors.

Office—Room 11, No. 303 California Street, San Francisco, California.

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DIVIDEND NOTICE.

SAN FRANCISCO SAVINGS UNION.
532 California St., corner Webb.
For the half year ending with 31st of December, 1888, a dividend has been declared at the rate of five (5) per cent per annum on term deposits, and four and one-sixth (4 1/6) per cent per annum on ordinary deposits, free from taxes, payable on and after Wednesday, January 2, 1889.

LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

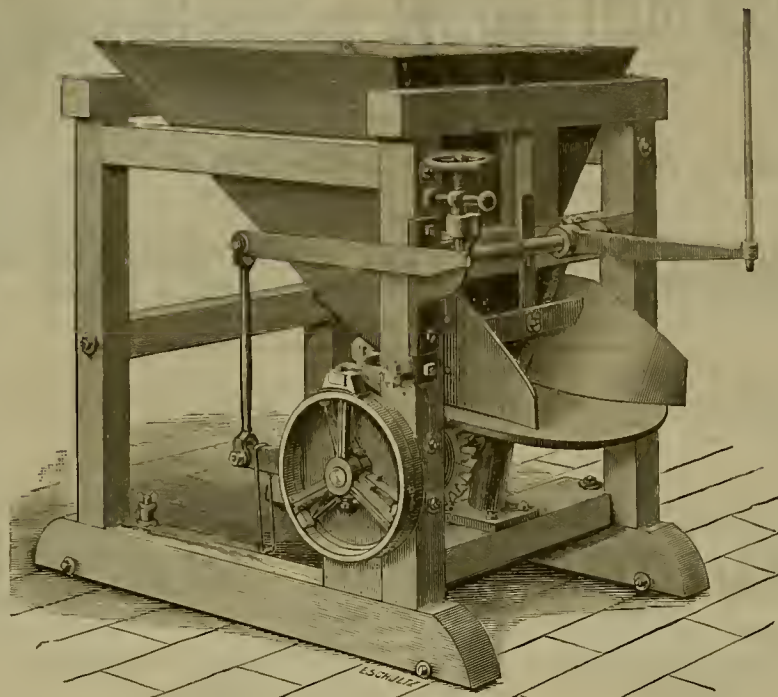
The German Savings and Loan Society,
526 California Street.

For the half-year ending December 31, 1888, a dividend has been declared at the rate of five and one-tenth (5 1/10) per cent per annum on Term Deposits, and four and one-fourth (4 1/4) per cent per annum on Ordinary Deposits. Payable on and after Wednesday, January 2, 1889.

GEO. TOUBNY, Secretary.

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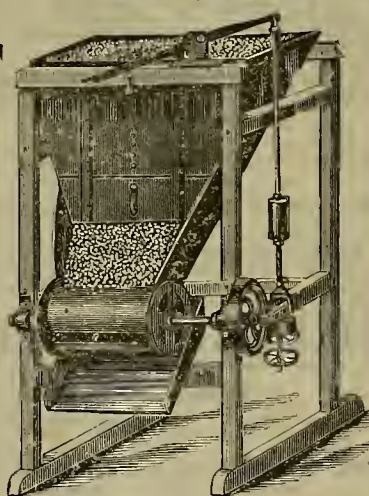
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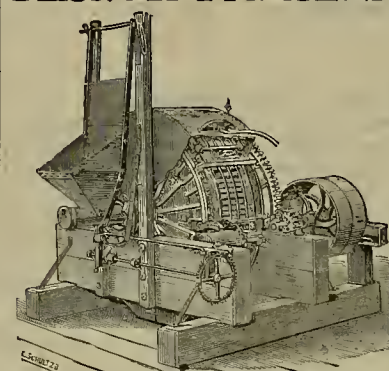
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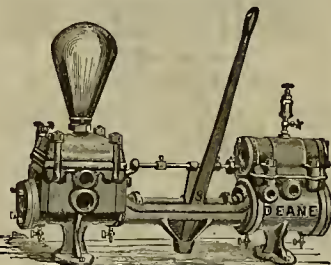
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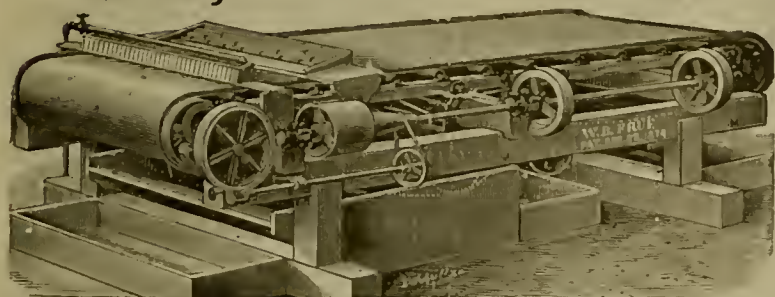
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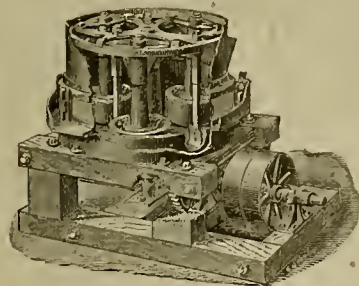
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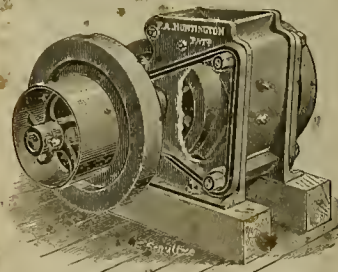
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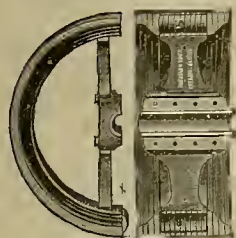
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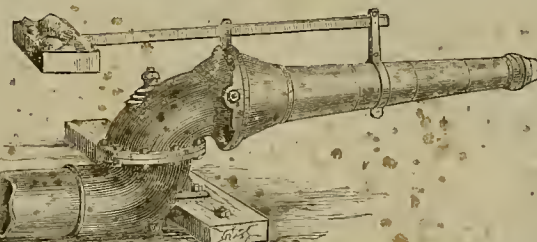
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INDEX TO VOL. LVI

-OF THE-

Mining and Scientific Press.

From July to December, 1888.

Academy of Sciences, 41, 63	Corporation Wrecking, 131	Idaho Jottings, 327	Idaho Gold, 329	Idaho of Mercury, 76	Idaho, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 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301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 353	Indiana, 242, 301, 333, 35
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